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At Colorado Fuel & Iron Corp.
Sleeve Bearing Production by
Unusual Casting, Machining
Inspecting Forged Turbine
Blades and Buckets
Production of Seamless
Steel Pipe and Tubes—II

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 125, NO. 16

OCTOBER 17, 1949

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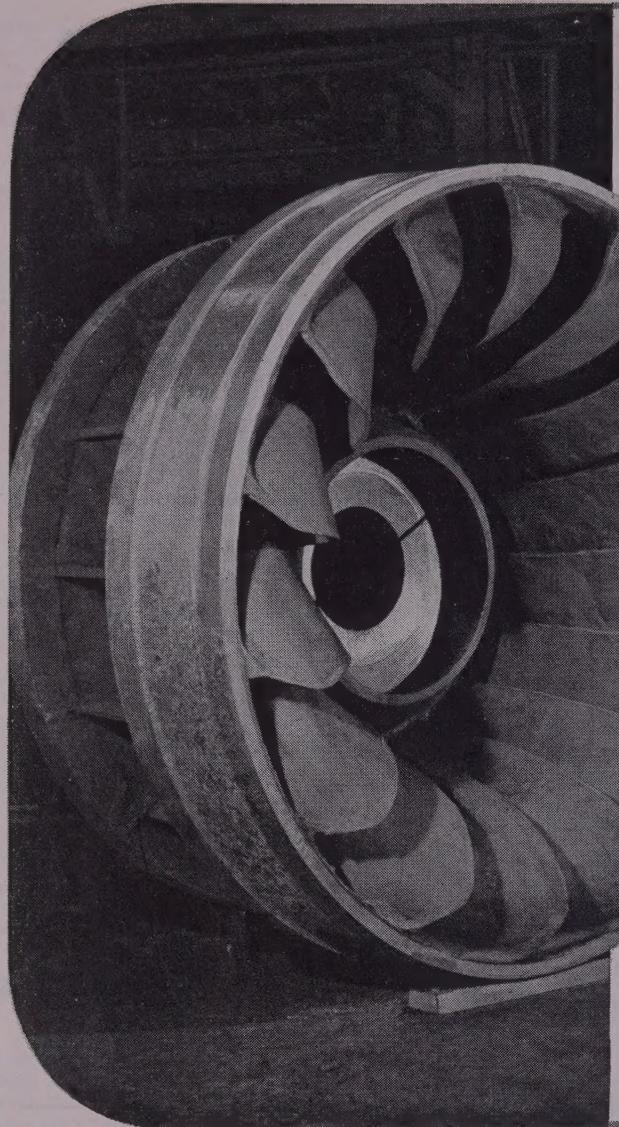
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★ Denotes Regular Features.



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AS THE EDITOR VIEWS THE NEWS

October 17, 1949

Hard Work Is Answer

At a time when the power of union leaders is strangling the nation it is opportune to consider what measures must be taken to rid the people of this menace. Whatever device is employed to end the present stalemate probably will be an expedient applicable only to this particular crisis. More important is a policy that will prevent future repetitions.

This calls for laws which will curb abuses of monopolistic power by either side. What are the prospects for such laws? A strong Taft-Hartley Act supporter, who lost his seat in Congress because of union opposition, answers in these words: "If Taft is defeated next year as a result of the strong campaign the unions are organizing against him . . . it will be five or ten years at least before any Congress will vote to destroy national labor union monopoly."

This ominous prediction cannot be taken lightly. The government administration and many union leaders will go all out to retain the monopoly now enjoyed. They have organization, money and determination to make an effective campaign. These advantages are impressive, but they do not mean that the battle for justice in labor relations is hopeless. If right-minded citizens will register their convictions in countable votes at the polls, union monopoly can be defeated.

The trouble has been that millions of persons who resent union leader monopoly have been slackers on election day. A check in an industrial county in a midwestern state shows that 37 per cent of the automobile dealers in the area did not vote in 1948 and 21 per cent were not even registered. Among independent grocers, 37 per cent did not vote and 32 per cent were not registered. Members of the Chamber of Commerce had a miserable record; 25 per cent did not vote and 19 per cent were not registered. In a check in another midwestern community the number of prominent industrialists who did not vote in 1948 was appalling.

Union monopoly exists largely because of the apathy of businessmen. Proponents of union monopoly work hard and vote. If businessmen, professional men and industrialists will work as hard as their opponents and will vote, they will win. It is as simple as that.

* * *

QUESTIONS RFC POLICY: Several months ago in this space mild apprehension was expressed as to the complications which would arise if Reconstruction Finance Corp. continued to broaden the scope of its loans to industry. Recent approval of a \$34.4 million RFC loan to Kaiser-Frazer is attracting new attention to this subject.

From Washington it is indicated that \$4.4 million of the loan will be used for tooling a proposed new small car, \$18 million for retooling medium and higher priced models and \$12 million for working capital. In Detroit stockhold-

ers and employees of other automobile manufacturing companies are wondering just how this deal stacks up. Does this loan of public money mean that stockholders and employees of General Motors, Chrysler and Ford, as taxpayers, are in reality subsidizing production, profits and jobs for a competitor?

Another question is to what extent, if any, does the granting of money to industry by RFC influence the management of the recipient companies in conforming to the Truman line on wages, pensions and the general aspects of the "welfare state"? Also, can RFC loans to industry

(OVER)

AS THE EDITOR VIEWS THE NEWS

be extended much farther without lowering the entire status of RFC financing to the level of pork barrel politics? Finally, if RFC is to steadily increase its loans to industry, loans from banks and capital derived from sales of stock will decline below their already low levels and the government gradually will become the principal source of borrowed funds. Is this desirable?

—p. 57

* * *

CARTELS FOR W. EUROPE? A significant argument over cartels is brewing in Western Europe. Many industrialists in France, Belgium, Luxemburg and Britain believe cartels are desirable and will be particularly beneficial as an interim device to cushion the shock when the Marshall Plan ends in 1952. American officials oppose cartels and their influence in Western Germany thus far has induced the German government at Bonn to remain anticartel. Since no major cartel could survive without participation of Western Germany, no important cartels have been formed to date.

Numerous steel consumers on the continent lean toward the American view. They argue that cartels artificially peg prices, discourage modernization, support high cost producers and make prohibitive the investment of capital in European industries.

From this side of the Atlantic, one would think that Europe's prewar experience with cartels was disastrous enough to cause everybody to think long and hard before reinstating them into the postwar economy.

—p. 53

* * *

AS VISITORS VIEW US: A British productivity team, which visited the United States under sponsorship of the Economic Cooperation Administration, has issued a 108-page report based upon its observations. It deals with the steel foundry industry and is the first report to be compiled by visiting teams from abroad.

The British foundrymen estimate that productivity in United States steel foundries is 50 to 90 per cent greater than in British steel foundries. Average man-year production in seven United States foundries is 19.34 tons, compared with 11.47 tons in seven British shops.

Visiting British foundrymen envied our tax system in that it does not discourage incentive to the extent that British taxes do. They concluded that "compulsion of fear" is a factor in American industry. They also observed that labor in United States foundries, as judged by

British standards, is "conspicuously unskilled."

Close study of this report may result in benefits on both sides of the Atlantic. There should always be two-way traffic for good ideas.—p. 52

* * *

CUTS PROCESSING COSTS: Increasing acceptance of high frequency induction heating methods probably is due to the fact that in many applications the end result in quality and economy of work more than offsets the initial high cost of equipment.

Among the advantages claimed for induction heating are that it permits rapid and accurate control of applied heat, that heat can be applied exactly to the area desired, that no warm-up time is required, that simplicity of control enables unskilled employees to operate the equipment, scaling and oxidation are held to a minimum, warpage is negligible and heating time and cost are low.

In spite of these many advantages, the process has its limitations and cannot be used indiscriminately. Properly employed on jobs such as through heating for forging, annealing for forming and drawing operations, and selective hardening, it offers an effective means of reducing processing costs.

—p. 72

* * *

NEED FIRM OPPPOSITION: A number of important bills will come up for discussion in Congress next year. Among them are revisions in laws to discourage monopoly, an increase in veterans pensions, extensive changes in tax laws, omnibus ship subsidy bill, overhauling of the patent law, national science foundation bill, national health bill and possibly additional powers for government to participate in industrial expansion in order to combat unemployment.

Many of these measures are highly controversial. Some of them are distinctly part of the Truman concept of the welfare state. All of them will affect American industry directly or indirectly. For these reasons it would be desirable if the opposition to objectionable features of these bills could be mustered more strongly around a more forceful leadership. The need for effective work by the minority party in our two-party system never was greater than it is now.

—p. 50

E. L. Shaner
EDITOR-IN-CHIEF

STRIKES—Expect increasing curtailments in metalworking activity from now on as effects of the steel and coal strikes spread (pp. 43, 44, 45). Steelmakers fear that when or if stoppages reach critical proportions the government might seize plants by exercising emergency authority under the Selective Service Act.

MILL PRICING—A settlement with the Federal Trade Commission may help solve your mill pricing problems (p. 48). These points have been agreed upon by principals in the FTC-steel case: 1. Mills can absorb freight if they are legally competing against each other; 2. mills must sell at f.o.b. prices if so requested by consumers. No agreement has yet been reached on abandonment by steel companies of standard extras and deductions . . . Revisions in the O'Mahoney freight absorption bill give promise of renewed congressional debate on the measure (p. 48).

SALES AID—Is financing a factor curbing sales of your products? (p. 46) Westinghouse Electric Corp. is making sure its dealers and customers know how to use all the financing available. The company a year ago introduced a plan to simplify and safeguard installment buying. This program will be pushed further now that Westinghouse has put seven finance representatives into the field to provide advice and assistance.

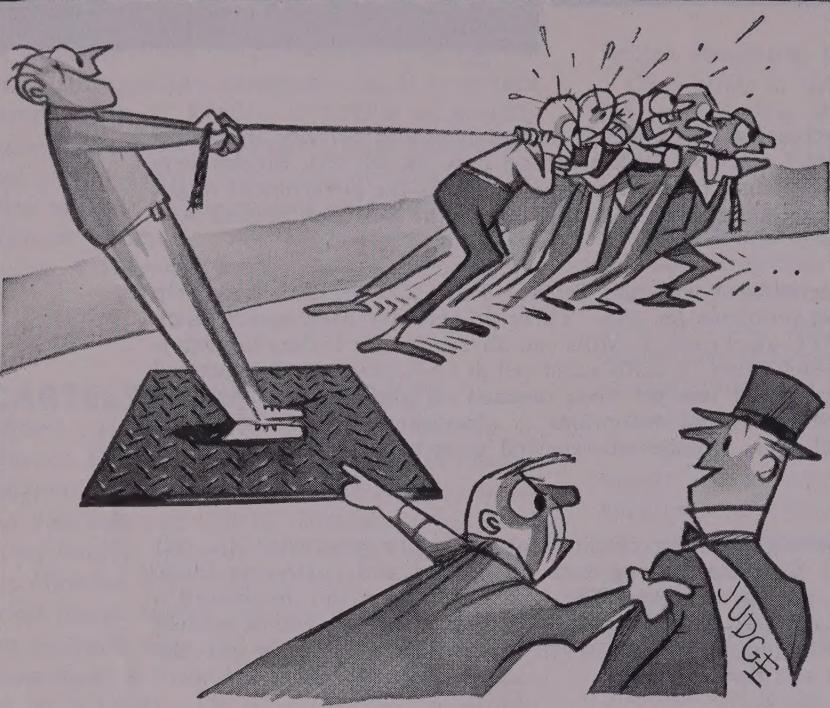
ORE BENEFICIATION—Erie Mining Co. is taking another step toward its goal of producing 10 million tons of concentrated iron ore from taconite annually at Minnesota plants (p. 49). In applying to the Minnesota Department of Conservation for sufficient water, the company seeks assurances that it will be worth while to continue engineering studies to determine the precise nature and size of its program. Processes finally to be used will probably follow closely those now being tested at Erie's preliminary beneficiating plant in operation near Aurora, Minn.

EUROPEAN CARTELS—Look for increasing pressure from Western Europeans for American approval of cartels (p. 53). The U. S. voice in the control of Western Germany—Ruhr producers are essential to the success of any trust—has thus far prevented the formation of any permanent monopoly.

CONSERVATIVE APATHY—If you are a political "conservative," you may be alarmed over the apathy of the opposition to "liberal" measures in Congress (p. 50). Reciprocal Trade Agreements Extension went through without a hitch. The Social Security Expansion bill passed the House by a huge margin. The Antimerger bill passed the House and is ready for Senate action. Differences in the separately passed measures to boost the minimum wage to 75 cents are being ironed out in conference.

FORD TRANSMISSION—Ford Motor Co. and Borg-Warner Corp. are tooling to produce a new automatic transmission which will sell for not more than \$150 (p. 57). The device will not be available for installation on Ford and Mercury models before next summer.

HERE AND THERE IN INDUSTRY—Mill distribution of four classes of finished steel—cold-rolled sheets, line pipe, reinforcing bars and galvanized sheets—hit record highs for the year in August (p. 54) . . . Cutting costs is the increasingly predominant theme at conventions attended by metalworking executives (p. 55) . . . How to do business with the Atomic Energy Commission is told in a booklet available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, for 10 cents a copy (p. 52) . . . There are now 34 areas with 12 per cent or more unemployment (p. 47) . . . Nine companies have announced they are buying or have bought corporate assets or are building or have built new plants (p. 60).



INLAND
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Strike Paralysis Lies Ahead

Few metalworking plants down for lack of steel. Many support steel companies' resistance to free pensions and insurance. Want showdown now

URTAILMENTS in metalworking activity resulting from the steel and coal strikes will become more apparent this week, may reach critical proportions by Nov. 1.

To date, few companies have been forced to close or to reduce operations for want of steel. The list is expected to grow rapidly in the weeks immediately ahead as stocks become unbalanced and as parts and components become hard to get.

Customers Support Resistance—Many metalworking executives hope steel producers will hold firm in their resistance to the union demands for noncontributory pensions and insurance. Some are willing to close their plants when they run out of steel if that will help support the industry's position.

They want a showdown now on organized labor's expanding demands. **Both Sides Adamant**—No weakening in the position of either the companies or the union is yet apparent. The government, through its conciliation director, Cyrus Ching, continued to seek a settlement.

CIO President Philip Murray is urging steelmaking centers making "pep talks" to strikers. While the steelworkers show little enthusiasm for the strike, they are staying in line.

Seeks Industry-Wide Settlement—Mr. Murray is insisting on settlements on an industry-wide basis. Ability to pay will not be considered by the union. If the companies don't pay, says Mr. Murray, they have no right to be in business.

The union indicates it will strike fabricating companies who refuse to grant free pensions and insurance. Contracts of many of these companies expire in the next few weeks. A dozen or so have signed up under union terms.

Settlement Chances—Growing concern is expressed by steelmakers over the possibility of government seizure of plants under the Selective Service Act. Management believes that if the strike continues until the industry is paralyzed, the administration may take over the plants, grant the union demands, and then offer

to return the mills to their rightful managers. This procedure was used in forcing coal operators to grant royalties to support the miners' now-bankrupt welfare fund.

Automakers Plan Changeover

Model changeovers are being scheduled for November by Ford, General Motors and possibly Chrysler. Steel supplies generally are adequate to run until then and many auto parts suppliers say they can keep going as long as the assembly plants.

Old "Friends" Return

If your phone rings this week and a voice greets you like a long lost brother, chances are that you will be talking to a gray marketer. Metalworking companies in Chicago, Milwaukee and other midwestern cities are being offered hot and cold-rolled sheets, carbon and alloy bars, hot or cold-finished, wire and other products at premium prices by salesmen they haven't heard from in months.

Gray market prices range all over the lot. Most offerings are at a



CYRUS CHING
... let's settle this thing

cent or a cent-and-a-half over warehouse prices. A few offerings of large quantities have been made at or slightly below warehouse prices. Steel purchasing agents question the quality of such offerings.

Most metalworking companies have comfortable inventories of steel and are not paying much attention to gray market offerings. Where they are short in particular products, they are filling in their inventories through regular warehouses.

Some metalworking companies are planning to sell their surplus inventories of "cats and dogs" acquired earlier through conversion deals.

Should You Order Now?

Would it do any good to send a steel order in to struck companies now? Most people apparently think not.

Steel sales offices report the new order letter pile is comparatively small and few if any Chicago companies can give definite poststrike delivery promises. Thinking that predominates is that it is impossible to set up schedules now. Time required for delivery after the strike ends will, of course, vary by products.

Many consumers, in expectation of the strike, placed orders they knew could not be delivered before the strike began. These people have priority. Mills generally did not have full order books for November and if the strike ends early next month, your presently placed order might be scheduled for late December on some products.

Good Future if Tieups Are Brief

You can expect your steel requirements to be met adequately and the nation's economy to improve next year if steel and coal tieups are not too long.

This is the forecast of David C. Roscoe, assistant general manager of sales for Bethlehem Steel Co., who spoke before the 39th annual convention of the National Association of Sheet Metal Distributors in Atlantic City, N. J., last week. The meeting was held in conjunction with conventions of the National Wholesale Hardware Association and the American Hardware Manufacturers Association, Oct. 10-13.

Light-gage galvanized sheets and roofing might continue tight in the early months, but they should be readily available by the middle of 1950, Mr. Roscoe believes. As of Oct. 1, demand still exceeded supply for most classes of pipe, cold-rolled

sheet, light-gage galvanized sheets and tin plate. Supplies of most other products were good.

Metalworking Firms Struck

About 16 out of 75 major metalworking plants, other than steelmaking, in the Pittsburgh-Wheeling-Youngstown area are on strike. Of the 90,000 wage earners in these 75 plants, 8000 are striking.

Many metalworking plants are operating under contract extensions which permit the workers to strike at a moment's notice or within a specified time ranging up to 30 days. Union policy will probably keep employees on the job at these plants as long as possible. A check of metalworking companies in the area indicates that most will be able to maintain partial operations for another three or four weeks before their steel supplies are exhausted.

Pennsylvania State Employment Service estimates the number of striking workers in the Pittsburgh district as: Steel, 112,600; coal, 12,550; metal fabrication, 1250. Workers furloughed because of the steel and coal strikes total 6500 railroad employees; 1200 in stone, clay and glass industries; 510 in construction; and 11,300 in wholesale and retail categories.

Suppliers' Shortages Felt

You may be more worried about your suppliers running out of steel than about shortages in your own plant.

McCormick Works of International Harvester Co. in Chicago is grappling with this situation. Shortage of steel forced its implement wheel supplier to close. With no wheels, production of implements comes to a halt and between 900 and 1000 employees are laid off. Other parts on which production depends are growing scarce as a strike in another supplier's plant continues. So in the next two or three weeks the remaining 2500 workers must be furloughed.

Can Firm Has Enough Steel

Inventories of steel for manufacture of containers in American Can Co. plants will, in general, be adequate to meet customers' estimated needs unless the steel strike continues for an exceptionally long period, Carl H. Black, president, says.

U. S. Strike Crimps Canada

A prolonged U. S. steel strike will have a serious effect on Canadian industry which relies on American mills for about 25 per cent of its total steel requirements. Canadian consumers have been carrying, on the average, only about 14 days' inventory. Government officials fear

that a return to wartime controls on distribution of steel may be necessary.

Canada consumes over 4 million tons of steel annually, about 1 million tons of which normally comes from south of the border. Canadian steel mills are operating at capacity.

Frisco Steel Users Well Off

Steel consumers in the San Francisco area have finished product inventories available for at least 60 days. This unusually good situation exists because well stocked bay area warehouses signed an agreement to end their 109-day labor tieup just as the steel strike began.

An additional aid to steel users will be continued operation of two West Coast plants: Kaiser Steel Corp.'s Fontana, Calif., mill and Pacific States Steel Co.'s plant at Niles, Calif. All other major producers are closed.

September Ingot Output High

Production of steel ingots and steel for castings in September totaled 6,572,284 net tons, or 83.3 per cent of capacity. Third quarter output was 19,066,151 tons, or 78.8 per cent of capacity. Production for the first nine months amounted to 64,991,496 tons, or 90.4 per cent of capacity.

American Iron & Steel Institute reports show that September figures compare with 6,714,745 tons produced in August, or 82.2 per cent of capacity, and with 7,424,844 tons produced in September, 1948, or 96.2 per cent of capacity. Output in the third quarter of 1948 totaled 21,947,195 tons, or 92.7 per cent of capacity. Corresponding figures for the first nine months of 1948 are 65,065,238 tons produced and operations at 92.2 per cent of capacity.

The steel strike is impeding release of some regular reports because a number of companies haven't access to records in plant offices.

C & O Revenue Falls

If the coal strike should continue through October, revenues of Chesapeake & Ohio Railway from hauling the bituminous fuel will be reduced by \$15 million. C & O is the largest originating carrier of bituminous coal. It comprises about 68 per cent of the total cargo tonnage handled by the road.

Since start of the three-day work week in the coal mines last month and the subsequent complete close-down of the bituminous mines, C & O has furloughed about 8500 workers.

W & L E Furloughs 1073

Layoffs by the Wheeling & Lake Erie Railroad, predominantly a coal

and iron ore carrying line, have reached 1073 since the coal and steel strikes started.

Nickel Plate Lays Off 849

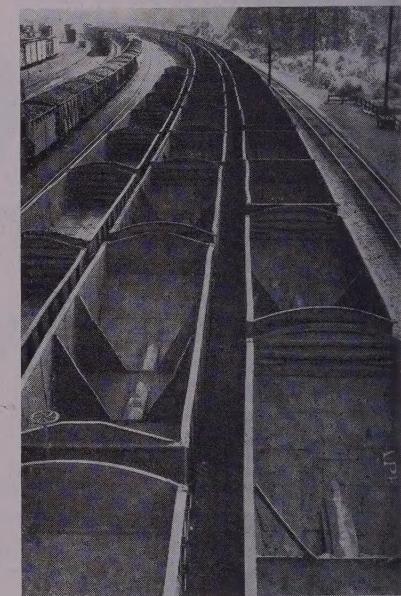
Nickel Plate Railroad has laid off 849 workers, or about 6 per cent of its total working force, because of the steel and coal strikes.

Railroad Recalls 300

The Delaware & Hudson Railroad has recalled about 300 workers to its shops in Colonie, N. Y. Still not called back are 260 workers laid off last June at these facilities.

Coal Strike Dampens Joy

"Prolonged and cumulative disturbances" in the coal industry have curtailed operations and reduced earnings of Joy Mfg. Co., Presiden-



CINCINNATI

... the lines grow longer

J. D. A. Morrow says. The Pittsburgh firm makes mechanical mining equipment. Mr. Morrow says the three-day week in coal and late the complete stoppage of mining has caused mine operators "not only to postpone placing new orders with us but also led them to make cancellations of some orders already placed and to instruct us to hold up deliveries on others."

Limestone Quarries Hard Hit

Limestone quarries in the Bessemer-Hillsville district of western Pennsylvania and eastern Ohio are hard hit by the steel strike.

Quarries operating there are the Carbon Limestone Co., Bessemer Limestone & Cement Co. and Pittsburgh Limestone Co., the last a U. S. Steel subsidiary. Officials of the

carries say they can't pile up the one, so must discontinue quarrying during the steel strike. Part of their forces are at work removing overburden and doing other jobs, but this cannot be carried on for long.

Sales Good if Strike's Short

Fourth quarter sales will be good if the steel strike is not prolonged, says Grant S. Diamond, president of Electro Refractories & Alloys Corp., Buffalo. Third quarter sales were off 10 per cent from the second period, and the fourth quarter would show continued improvement under normal conditions.

Inland Furloughs Ship Crews

Inland Steel Co. has furloughed most of the crews of four big ore carriers, *L. E. Block*, *P. D. Block*, *J. Block* and *Joseph Block*, because of the steel strike.

Lakes Ship Repairing Down

American Ship Building Co., Cleveland, is experiencing a decline in repair business on Great Lakes vessels partly because of the steel and coal strikes. The company thinks reduced demand for steel and coal and the labor disputes will prematurely curtail the shipping season this year.

Grain Bin Plan Continues

The steel strike, say Commodity Credit Corp. spokesmen, is causing a few delays in deliveries but will not prevent execution of the grain storage bin program in time to prevent dumping of grain on the ground farms this fall.

When orders for storage capacity of 280 million bushels were placed last summer, 60 per cent, or 164 million bushels were to be built of steel and the remainder of other materials. Steel storage capacity whose delivery is held up by the steel strike comes to 27 million bushels. To make up this shortage, CCC has ordered that amount of capacity to be made in wood and aluminum, and shipments against these new orders already are going forward.

Trade Ahead of Strike

A lengthy steel strike should have little effect on availability of Christmas merchandise, says Arthur Keating, president and chairman of Elko Products Co. The Chicago firm makes kitchen utensils and many other products.

Steel Shortage Hits Thor

Inadequate steel supplies will cause suspension in production of Thor Corp.'s Automagic washer this week, says Raymond J. Hurley, board chair-

man. Several hundred employees are expected to be laid off in the firm's Chicago plant when production is curtailed. Thor also makes ironers at the same plant but has enough steel to continue this line for another 30 days.

September Employment Off

Labor disputes in the coal, steel and railroad industries are causing secondary unemployment: They helped boost initial claims for unemployment insurance by 16,100 to 245,200 during the week ended Oct. 1. This gain in initial claims was also caused by temporary layoffs in the Michigan auto industry.

Unemployment insurance continued claims, indicating completed weeks of unemployment by individual claimants, declined by 96,505 to 1,806,073 during the week ended Oct. 1, the lowest level reached since the second week in February. The decline in continued claims reflects increased industrial activity in late August and

Pension Tryout in Toledo

UNITED Auto Workers will serve demands on about 125 manufacturing plants in the Toledo, O., area for payments of 10 cents an hour for every employee into an "areawide pension fund," starting next Jan. 1.

A spokesman declares the union will not hesitate to strike any plant which refuses to cooperate. An ultimatum was delivered to the first 15 companies last week. Under direction of the UAW international headquarters, the plan is being initiated in Toledo as a testing ground. The 15 companies initially involved, nearly all in the automotive industry, employ 20,000.

September. Initial claims came mostly from Illinois, Michigan, New York and Pennsylvania.

Why a Strike? Company Ads Raise This Question

WHY should there be a steel strike? That's the question raised in full-page newspaper advertisements by several steel companies which point out how advantages at their plants surpass union demands.

Great Lakes Steel Corp., Detroit, setting forth three examples of benefits from its nine-year-old retirement income plan and Social Security, shows: 1. A laborer, lowest-paid of production men, would receive a monthly pension of \$128.29, or 60.2 per cent of his monthly average wage of \$212.79; 2. a millwright would get a monthly pension of \$171.50, or 56 per cent of his average monthly earnings of \$306.21; and a heater would get a monthly pension of \$392, or 61.5 per cent of his average monthly pay of \$638.20.

They Don't Stand Still—The Great Lakes examples are based on straight-time hourly wages for a 40-hour week with each man entering the plan at age 30 and staying in it to age 65, and remaining on the same job 35 years. Workers, however, usually move up.

Under the Great Lakes plan employees make financial contributions to the retirement fund. The laborer's monthly contribution is \$7, the millwright's \$11, and the heater's \$32. These help provide the laborer with a life monthly income of \$73.50 from the retirement plan, the millwright with \$115.50, and the heater with \$336. These are supplemented with Social Security benefits of \$54.79 to the laborer, \$56 to the millwright,

and \$56 a month to the heater.

"With a pension plan so plainly beneficial to Great Lakes employees why should our plants be idle today?" the company asks.

Inland Gives Answer—One answer, according to Inland Steel Co.'s advertisement, is: "The trouble with the steel strike is simply that the CIO is determined to establish a nationwide steel pattern on its own terms. No offer, however fair, seems to be acceptable if it differs from its pattern."

Inland says it supposed the union struck rather than permit a worker to pay part of the cost of a welfare plan. "But," asserts the company, "that can't be it, for the CIO has recently accepted welfare plans in automotive and other industries in which the worker does pay part of the cost." The company further points out that the CIO has contracts with other companies where the pension is \$100 a month, including social security, after thirty years of service. "At Inland it would amount to \$147 per month, including social security, for the average worker," the company declares.

Advertisement of Lukens Steel Co., Coatesville, Pa., itemizes benefits under the plan it has offered the union. Lukens would pay two-thirds of the cost, the employee one-third. It also states that although Lukens considers pensions are not bargainable now, it offers to continue its present hourly-worker pension plan for which the company pays the entire cost.

Steel's Labor Picture Changes



... from this in 1892 when Homestead strikers fired on Pinkerton guards

DRAMA in this steel strike? Oldtimers claim the highest dramatic peak in steel's labor history is still the Homestead conflict of 1892.

In July of that year Carnegie Steel Co. scaled down tonnage rates to workers at its Homestead, Pa., plant, many of whom were paid on a production basis. Output had risen so rapidly at this works that the take-home pay of nearly all the 3800 wage earners would have remained the same, but the old Amalgamated Association led the men out.

The union took a militant stand against employees trying to go to work and made elaborate preparations to prevent anyone from crossing its lines. These precautions included the chartering of a steam boat and the use of a fleet of 50 row boats to patrol the Monongahela river on which the Homestead plant had frontage.

Carnegie hired 300 Pinkerton agents to protect its property and tried to move them in by way of the river. On July 6 the detectives were concealed on barges, but news of their attempt to reach the plant leaked out. Enraged Homestead strikers tore down part of a wooden fence at the plant and rushed to the river. The Pinkerton men were driven back to their barges. The National Guard arrived two days later, but intermittent violence lasted until Nov. 21, 1892, when the strike was called off.



... to this peaceful picketing now at the present Homestead plant

Sales Aid

Westinghouse assigns seven men to help dealers use its financial plan in buying

KNOW HOW to use all the financing available to you in running your business?

Westinghouse Electric Corp., Pittsburgh, isn't taking a chance that some of its dealers don't.

This company, which a year ago introduced its "Equity Plan" to simplify and safeguard installment buying and encourage local bank financing of electric appliance purchases by dealers and their retail customers, is now putting seven installment finance representatives into the field to provide on-the-spot advice and assistance to banks and dealers in all parts of the country.

Expert Advice Available—One man is being assigned to each of seven merchandising districts and will be responsible for mutually beneficial financing relationships between dealers and banks in his specific territory. Thus, expert technical assistance on financing problems will be provided on a national basis, says C. F. Gilbert, manager of the company's Retail Finance Division.

Under the "Equity Plan" banks are given broad protection in financing dealer inventories of Westinghouse merchandise. Through a wholesale repurchase agreement, Westinghouse agrees to repurchase any such merchandise which may have been repossessed. "Given such assurances," Mr. Gilbert points out, "the bank can safely provide financing for the majority of dealer's purchases."

Benefits—Here is where Westinghouse benefits: Dealers are enabled to carry a more representative display of Westinghouse merchandise.

Dealers benefit too: Not only do they have a more complete line to sell from but their working capital is conserved since they do not have to pay in full for the products at time of purchase.

Consumers also benefit, says Mr. Gilbert, through economies made possible by local bank handling. "By handling such retail financing through the local banks, local men with clear understanding of local credit conditions are making the decisions. We believe this to be realistic procedure and extra protection against unsound installment selling."

Plan Is Voluntary—The "Equity Plan" is entirely voluntary and both banks and dealers are free to make financing arrangements dictated by their local requirements. A survey, however, shows 85 per cent of the

estinghouse appliance dealers who
ance their inventories are doing so
ugh their local bank largely as a
ult of the "Equity Plan."

Further testimony of acceptance of
s program, Mr. Gilbert points out,
the fact that almost 900 banking
ations in 37 eastern states alone
are available to finance the ap-
pliance, radio and television inven-
tories of Westinghouse dealers and
their customers' retail purchases.

Since the Westinghouse "Equity
Plan" was announced a number of
other national manufacturers have
completed similar bank financing
grams and many others consider
such plans are corresponding with
Westinghouse.

Distressed Areas Increased

PE that the recent upsurge in
business would diminish the need for
President's program of "spot as-
sistance" to distressed areas is not
receiving much tangible support.
Two spots—Centralia, Ill., and
Bridgeton-Sanford, Me.—have been
removed from the list but four new
ones added—New London, Conn.,
Wellesburg, Mass., Lowell, Mass., and
Johnstown, Pa. There are now 34
areas with 12 per cent or more un-
employment on the basis of unem-
ployment compensation payments.

The program comprises assistance
through the channeling of procurement,
construction and loans "and other activities of the federal govern-
ment to alleviate unemployment in
areas where it is serious" but ac-
tually the results have not been spec-
tacular. There are many statutory
details on the program. Loans have
been made with reasonable assurance
that they will be repaid. Construc-
tional projects require advance plan-
ning and appropriations. All involve
considerable red tape. Procurement,
except in those instances where the
contracts can be placed by negotia-
tion, calls for competitive bidding and
the award of the contract to the low-
bidder.

The Commerce and Labor Departments continue the active agencies
administering the program. Com-
merce has organized local groups in
each of the critical labor market
areas to see that firms in those areas
have bidding opportunities, and to ren-
der all possible services. Some of the
communities are going so far as to
attract new industries and new business
from old industries. All are encourag-
ing local and state public works.

May Iron Award to Cannon

LD MEDAL Award made by the
May Iron Founders Society Inc.,
Cleveland, will be presented to George

W. Cannon, retired chairman of the
board, Campbell, Wyant & Cannon
Foundry Co., Muskegon, Mich. The
society's highest award will be made
at its 21st annual meeting at the
Edgewater Beach Hotel, Chicago, Oct.
28.

Mr. Cannon played a major role in
the work of the War Production
Board and later the Munitions Board
of the National Military Establish-
ment.

Curtiss-Wright Gets Contract

COLUMBUS, O., plant of Curtiss-
Wright Corp. has been awarded a
\$1.2 million contract by the Air Force
to produce spare parts for C-46 Curtiss
Commando airplanes.

The plant will begin production
immediately. Final deliveries will
not be completed until March, 1951.
Other contracts will add \$100,000
more to the facility's backlog.

Permanente Aluminum Sales Up

PERMANENTE Metals Corp., Oak-
land, Calif., sold 60 per cent more
aluminum in September than the

average volume for the preceding
three months.

The company explains that the
gain results from: Acceleration of
industrial activity; its entry into pro-
duction of aluminum foil, wire and
cable; and normal seasonal improve-
ment in aluminum sales.

Utah Plant Partially Closed

AMERICAN Smelting & Refining Co.
has partially closed its Murray, Utah,
plant. Some minor operations will
be continued until the unit is per-
manently shut down by yearend.
Most of the 250 Murray workers will
be absorbed by the company's new
anode plant at Garfield, Utah. That
facility is about 25 per cent com-
pleted.

To Make Butt-weld Pipe

BUTTWELD pipe from 1 to 4 inches
in diameter will be made on the new
pipe mill being constructed by
Youngstown Sheet & Tube Co. at its
Indiana Harbor Plant, East Chicago,
Ind. The pipe mill is scheduled for
completion in May, 1950. When the



DUST CATCHERS: Electronic air scrubbers for steel mills in the United States, Brazil, France and South Africa are in the making at Westinghouse Electric Corp.'s Sturtevant Division plant, Boston. The vault-like cubicles contain precipitron cells, electronic air cleaners which remove 90 per cent of air-borne dirt and dust. Each of the cubicles can clean more than 36 tons of air an hour. NEA photo

mill is ready for scheduling the company will discontinue its production of lapweld pipe in the Chicago area.

Pricing Settlement?

Way would be opened for some absorption of freight. Standard extras would be out

IF the currently discussed settlement in the Federal Trade Commission case against the steel industry's old multiple-basing-point, delivered-price system is accepted by the parties in the case, the way will be opened to a substantial modification of the present industry policy of quoting f.o.b. mill prices.

Under the proposed settlement each steel mill would be assured of the right to absorb freight "excepting when such freight absorption unlawfully lessens competition." This means mills would be able to absorb freight in competing against each other, but such practices as quoting a lower price to one warehouse than to others in the same city would be taboo.

Standard Extras Out — Another change which the proposed settlement would bring about is abandonment of existing standard extras and deductions to be added to or subtracted from base prices for each product. Fixing of extras and other price elements would have to be done on an individual company basis. This feature is said to be the one that has caused respondents to move slowly in considering acceptance of the proposed settlement. There is no opposition to the other two points, which call for establishment of an f.o.b. price at each mill and willingness on the part of each mill to sell at this mill price if so requested by consumers. Purpose of this latter clause is to enable consumers to buy at mill prices and haul the steel to their plants by rail, truck or water—which ever is more advantageous.

Should this settlement be accepted by the steel companies it would not become final until approved by the Federal Trade commissioners.

Pricing Bill Revised

The O'Mahoney freight absorption bill had three significant changes in it last week at the end of a House-Senate conference agreement.

Change No. 1 represents a considerable softening from the Carroll limitation of the right to absorb freight to meet the equally low price of a competitor in good faith.

Change No. 2 spells out specifically the provision that justification for a price discrimination may not be used



UNIQUE CONSTRUCTION: The 150-foot catalytic cracking tower at this refinery will be on stream ahead of schedule because of the construction method. Towers like this, previously constructed vertically piece by piece, had to be raised and welded into position. This one, fabricated by Southwestern Engineering Co., Los Angeles, was fabricated at ground level on a horizontal concrete slab. Here, the reactor, intermediate skirt and stripper assembly, weighing 85 tons, are lifted into place atop the regenerator

as a defense for antitrust law violation.

Change No. 3 was considered the one that would provoke most opposition. It would make it possible to proceed effectively in cases involving illegal competitive practices only by producing reliable probative and substantial evidence. Under prevailing procedure the Federal Trade Commission can reinforce charges of illegal competition with any evidence whatever and the courts must support them.

Approves Freight Rate Cuts

FREIGHT RATE reductions are authorized on a permanent basis now on iron and steel carried by rail from U. S. Steel Corp.'s Geneva Steel Co. in Utah to West Coast points.

New rate authorized by the Interstate Commerce Commission is \$12.60 a ton. This is \$5.60 lower than could be charged as a result of freight rate adjustments permitted by the ICC in the last few years.

Machinery Shifts Continue

United Engineering, Cincinnati Lathe acquire subsidiaries. Industry concentrates facilities

CHANGE in ownership of two more prominent machinery building firms focuses attention on the shifts in the industry which have become increasingly frequent in the postwar period. Latest announcements concern the acquisition of Canedy-Otto Mfg. Co.'s line of upright, sensitive and radial drills by Cincinnati Lathe & Tool Co.—Cincinnati Milling Machine Co.'s subsidiary, and United Engineering & Foundry Co.'s purchase of Stedman Foundry & Machine Works Inc., Aurora, Ind.

As in previously reported purchases, the buyers have enlarged the scope of their business by diversifying their line. Since the end of the war there have been more than 30 such acquisitions by machinery builders. Some of the deals involved the sale of very babies. Old and well established firms, too, are passing out of the picture. The wartime explosion which saw machinery builders' plants springing up in new areas has been followed by a postwar implosion resulting in a withdrawal to traditional machinery building centers.

Cincinnati Lathe will transfer Canedy-Otto's engineering, manufacturing and sales operations from Chicago Heights, Ill., to Cincinnati. The other machine tool line is added to the concentrated machinery building operations in suburban Oakley.

United Engineering's purchase of Stedman is reported to involve \$1.5 million. The Pittsburgh company plans to continue its new subsidiary operations under the Stedman name.

Old Story Gets New Twist

A new twist to an old story is the German language catalog prepared by Amertool Services Inc., Cincinnati. The export firm formed by 11 American machine tool builders is sending the catalog to its German representative, Stengel & Co., Weisbaden. The situation is the reverse of previous days when German builders had their catalogs translated to English for distribution here.

Sell More, Predict Less

Greater sales effort without due attention to forecasts of either the optimistic or pessimistic value is the steady, sure fire formula for improved business. E. K. Weis, president, Charles H. Besly & Co., Chicago, set forth this argument at a sales and executive meeting of the tap and grinder manufacturers' firm.

Erie Mining Seeks Water Supply for Proposed Ore Beneficiation Plants

Erie Mining Co. is moving closer toward its goal of producing 10 million tons a year of concentrated iron ore from taconite. The company is applying to the Minnesota Department of Conservation to get an adequate water supply for beneficiation plants proposed for construction near Aurora, Minn.

For some years Erie has been experimenting at its Hibbing, Minn., laboratory with processes for obtaining a suitable iron ore concentrate from taconite. Last year the company began operating a preliminary plant near Aurora, using full-scale equipment. Shown below is the mechanical arrangement of this facility which has a capacity of 200,000 tons of concentrates yearly. If larger plants are built they will be designed

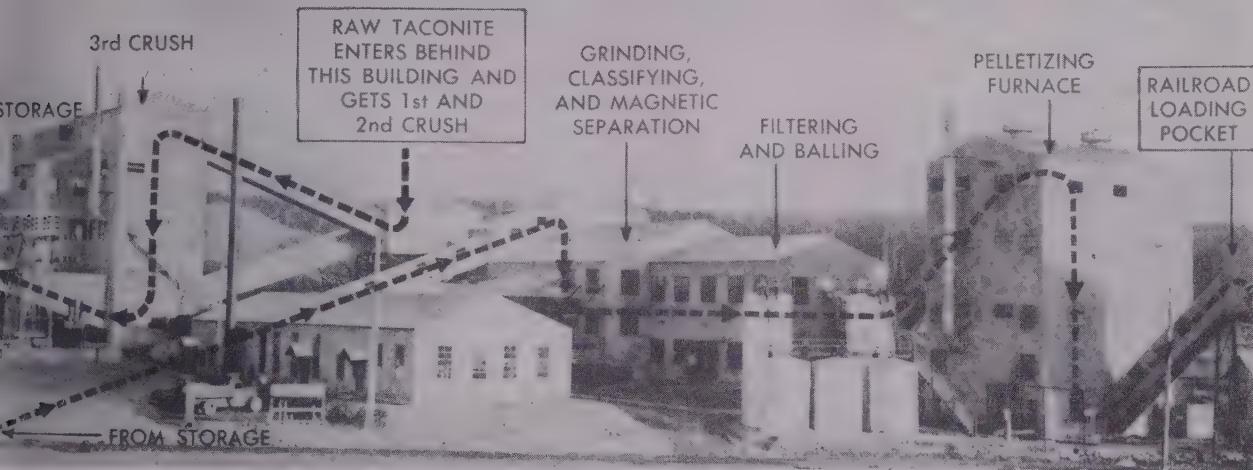
to use processes similar to those used in the preliminary unit.

Water Essential—No final decisions have been made about building the large plants. Sufficient water must be assured before engineering studies can be concluded to reach these decisions. The water application asks permission to construct a channel, dams, spillways and pumps to form a reservoir. The first large plant contemplated would have capacity to produce 2.5 million tons of concentrates a year. Erie would build additional units as the need arose until facilities to produce 10 million tons annually would be available.

Billions of tons of the low-grade iron-bearing taconite exist on the Mesabi range. High grade ores in the area are running out, can last

only about 18 more years on the average. Erie is operated by Pickands Mather & Co., Cleveland, for Bethlehem Steel Corp., Youngstown Sheet & Tube Co., Interlake Iron Corp. and itself.

From Three to One—The process now being experimented with reduces three tons of taconite to one ton of pellets containing 63 to 65 per cent iron. The crude taconite passes through a series of dry-crushing and wet-grinding operations which pulverize it so that the iron particles can be separated magnetically from waste siliceous material. To make a suitable charge for the blast furnace, the fine iron concentrate is then rolled into walnut-size pellets. These are baked to a strength adequate to withstand the journey to furnaces.



ERIE MINING CO.'S PRELIMINARY BENEFICIATION PLANT
... taconite is turned into pelletized ore ready for furnaces

Steel Exports, Imports Fall

PROGRESSIVE exports in July were down more than 46,000 net tons from June's total. Commerce Department figures show overseas shipments in July to be 460,979 tons, compared with 507,312 tons in June. A much steeper drop resulted in imports. July's aggregate of 2214 tons was down 2 per cent of June's 14,057 tons. The totals and trends for the latest month are interesting because they were compiled for a month in which steel demand in the U. S. dipped to a low for the year. The Commerce figures for outgoing and incoming steel have declined. Import and export totals will bear watching in future months to see the effect on them of foreign currency devaluations. Scrap exports climbed sharply to 5,511 tons in July from 54,725 tons

a month earlier, showing effects of a slow domestic market. Imports also showed this trend by falling to 52,359 tons from 91,838 in June. The decline in scrap imports has been evident since the first of the year. Contracts for foreign scrap have not been renewed upon expiration and monthly shipments have dropped steadily from the 200,000 ton monthly average at the end of the first quarter. June and July iron and steel exports by principal categories were:

(Net Tons)

	June	July
Semifinished	53,426	59,200
Iron and steel bars	53,306	47,182
Sheet and plates	180,938	175,522
Structural shapes	61,861	35,453
Railroad supplies	36,387	21,477
Tubes, pipe, fittings	81,910	85,492
Wire products	33,539	32,684
Nails, other fasteners	5,945	3,969
Total	507,312	460,979
Pig iron, ferroalloys	13,893	3,111
Scrap	54,725	187,511

Commerce Department's breakdown of imports for July and June is:

(Net Tons)	June	July
Ingots, etc.	5,545	...
Wire rods	316	65
Iron bars, slabs	23	12
Reinforcing bars	95	200
Hollow bar, drill steel	1	...
Other bars	86	65
Boiler, other plate	5,879	322
Sheets, etc.	280	27
Tin plate, etc.	...	1
Other hoops, bands	...	23
Structurals, piling	927	834
Rails, fastenings	9	66
Wheels, axles	...	2
Pipe, tubes	476	240
Round wire	1	5
Flat wire strip	215	140
Telegraph wire	105	74
Wire rope	56	96
Nails, etc.	37	24
Bolts, nuts, rivets	3	6
Castings, forgings	3	7
Die blocks, blanks	...	5
Total	14,057	2,214
Pig iron	213	...
Sponge iron	253	...
Ferromanganese	1,510	133
Ferrosilicon	84	29
Ferrochrome	84	195
Scrap	91,838	52,359

Capitol observers wonder about apathy of "conservatives" toward "liberal" measures in Congress. Present situation is radically different from that of 10 or 15 years ago

WASHINGTON observers are puzzled over the apathy of "conservative" elements in the population toward "liberal" measures which have been, or are in process of being, enacted by Congress.

They have especially in mind the Reciprocal Trade Agreements Extension Act which went through Congress without a hitch and has been signed by the President, the Social Security Expansion bill which passed the House by an enormous majority, the antimerger bill which passed the House and now is approaching Senate action and the vote in both houses, now in conference, to increase the minimum wage to 75 cents.

Ten or fifteen years ago such measures would have made Washington come alive with people objecting to them or interested in having them modified. Observers interested in studying trends wonder just what the cause of the present complaisance is. Is it because the country is rich and prosperous, and people are comparatively uninterested in new "liberal" legislation? Is it that conservatives are shell-shocked by the continual barrage of liberal legislation of re-

cent years, and have given up the fight? Or could it be that sentiment has changed, and that "liberal" legislation now is more widely supported?

Especially Noteworthy — Indifference of industry is especially noteworthy. Manufacturers used to flock to Washington in the old days to fight against legislation they considered undesirable. Today comparatively few of them come to Washington for that purpose. Those that do come usually have been invited or subpoenaed. Even large industry trade associations seem half-hearted in opposing legislation which, you would expect, their members do not favor.

Here is one illustration: Few manufacturers' organizations have a policy on the antimerger bill which, if passed, would narrow the market for businesses whose owners for one reason or another wished to sell out.

Whatever the reason for this attitude of indifference, one thing is certain—it plays into the hands of those who are not satisfied with what already has been done in the "liberal" direction but are intent on more and more political face-lifting.

Some of the legislation now being shaped up for next year's session in Congress is quite controversial. There is little doubt that it could be improved substantially if business and industrialists felt a greater sense of responsibility.

Important Bills for Next Year — An important study is in progress over the old question of revising our laws to discourage monopoly. The veteran's pension increase bill again will be called up next year. The antimerger bill still is pending in the Senate. The Ways and Means Committee contemplates extensive changes in our tax system next year, with probable repeal or reduction of many excise taxes that are burdensome to industry. Other measures to be acted on next year are the omnibus ship subsidy bill, radical overhauling of our patent law, the national science foundation bill, the national health bill and, if unemployment again becomes serious, a bill which would give the government vast powers to finance and participate in industrial expansion.

Businessmen will have an opportunity over the next six months to take a part in the formulation of legislation which will have an important bearing on our country's development. The big question is: How many will take advantage of it?

Cause of Strike Headaches

WHILE Taft-Hartley Act supporters in Congress are aware that failure to illegalize industry-wide and union-wide bargaining under that law is responsible for the present steel and coal strike headaches there probably will be no attempt either at this or next year's session to correct that omission. Prevailing disposition is to leave it to the President to handle these strikes, and reserve new congressional labor legislation until after the results of the 1950 elections have become known.

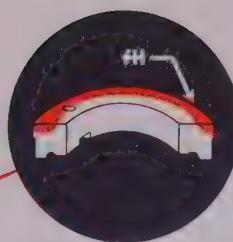
A strong Taft-Hartley Act supporter who lost his seat in Congress last November because of union opposition analyzes prospects this way: "If Taft is defeated next year as a result of the strong campaign the unions are organizing against him—and you must remember that Taft came through with a very narrow margin last time without such opposition—it will be five or ten years at least before any Congress will



DEFENSE COMMITTEE: Defense Secretary Louis Johnson (standing) addresses the first meeting of the North Atlantic Pact Defense Committee. He is confident that the 12 pact nations will be able to avert war by building up their defenses. NEA photo



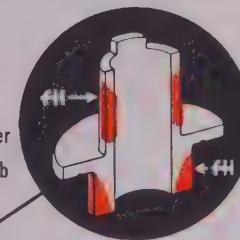
oil pump valve



clutch adjusting nut



drive shaft



torque converter hub



torque converter internal cam



1826
Metal Show
per 17-21



hook roller



the new symbol

for faster, more economical surface hardening

On your part prints or assembly drawings . . . wherever you want to specify hardness values and patterns **and be sure of getting them** . . . write "fh." It's the new symbol for "flamatic hardened"—the term that made hot news at the last two Metal Shows with starter ring gears and torque transmission cams held to closer specs at higher speeds than ever before.

At this year's Metal Show, flamatic hardening, with electronic control, does it again, demonstrating in actual production how "fh" puts the right hardness in the right place in pipe wrench jaws—and opens up a promising new field of applications. **By all means**, see the Flamatic demonstration at the Metals Show. Or write for new booklet on how Flamatic hardening makes better products **cost less**.

©

Flamatic

THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio, U.S.A.

CINCINNATI

vote to destroy national labor union monopoly."

Training Given in Warehousing

IF YOU are interested in enrolling selected employees in the warehousing course again offered by the Munitions Board, write to the chief of the Storage Division, Munitions Board, 2E825 Pentagon building, Washington 25.

The course will be conducted late in October and in November at various military depots and warehouses throughout the country. Purpose is to acquaint private industry with stock control and other procedures, and with the various problems incidental to military warehousing, so that the armed services can benefit from more understanding co-operation in the event of war. Another object is to create a reservoir of trained men capable of manning military warehousing jobs in time of war. The course has been organized for completion in a single week.

British Take Ideas Home

PROOF that British productivity teams visiting the United States under Economic Cooperation Administration sponsorship have taken home many ideas for increasing British industrial efficiency is afforded by the first report to be compiled by such a group.

Written by the team representing the steel foundry industry, this report fills 108 printed pages crammed with leads on how British steel founders may increase their productivity. It is richly illustrated with photographs, drawings and statistical tables.

Highlights are the findings that productivity in United States steel foundries is 50 to 90 per cent greater than in British foundries, and that average man-year production in seven United States foundries is 19.34 tons of castings compared with 11.47 tons in seven British plants.

Copies of the book can be obtained from Economic Cooperation Administration, 800 Connecticut Ave. N. W., Washington.

Welding? Watch Ship Study

SHIP STRUCTURE Committee's program to develop safe, all-welded steel ships has become a very comprehensive one in the metallurgical research field. Results should be widely useful to fabricators of welded steel products.

The program includes basic research to determine nature and characteristics of the transition tempera-

ture phenomenon. It is aimed at removal of uncertainty about the reproducibility and reliability of the various tests to determine transition temperature and at the ultimate setting up of acceptable specification standards. It also includes identification of steelmaking practices and chemical analyses capable of exercising significant influence on transition temperature. The latter study in-

Fish Story

THIS fish story may be true. A German inventor of an electrical device for catching fish commercially has affidavits supporting it.

Office of International Trade has published a description of a product consisting of two electrodes to which is applied an adjustable voltage. Any fish which enters the electrical field is allegedly forced to head toward the positive electrode. Then, the varying voltage is supposed to cause the fish's tail muscles to contract and relax, thus moving the tail and propelling the fish toward the positive electrode where a net is placed. German fisheries experts who have examined the device have registered their approval.

cludes preparation of an integrated survey of all significant data relating to notch bar testing, and the re-analysis of all data to determine relationship between elastic strain energy and stress with reference to the change from ductile to brittle behavior.

In Field of Fabrication—The committee seeks to determine causes of the lowered ductility of welded structures as compared to unwelded members, particularly at lower operating temperatures. This includes studies of the relative notch ductility of the various zones across a weld, and of the initiation and propagation of cracks in weldments and related phenomena. Of immediate interest is development of a notch sensitivity test that will give fast and accurate results; to this end Charpy test results are being studied with a view to getting an acceptable pattern with fewer tests than now required.

Institutions conducting research on one or more phases of the overall metallurgical program are Swarthmore, Case, Battelle, Massachusetts Institute of Technology, University of Pennsylvania, New York Naval Ship Yard, National Bureau of Standards, Princeton, David Taylor Model Basin,

Watertown Arsenal, Carnegie Institute of Technology. Supervising these studies is the National Research Council's Committee on Ship Structures, Chairman, Dr. Robert F. Mehl, Carnegie Institute of Technology; vice-chairman, Dr. C. H. Herty Jr., Bethlehem Steel Co.; technical director, Dr. Finn Jonassen, National Research Council.

Comprehensive Ship Design Research—Also under way is a comprehensive research program on ship design.

Composed of representatives of Army, Navy, Coast Guard, Maritime Commission, and American Bureau of Shipping, the Ship Structure Committee is successor to the board created by the secretary of the Navy during the war to investigate causes of fractures in welded steel merchant vessels.

This study revealed that welded ship fractures in all cases resulted from notches and have occurred in notch sensitive steel. As a result, hatch corners were redesigned to alleviate notches, and riveted seams placed longitudinally in hulls or deck or both. These seams have proved to be good "crack arresters" but the objective is to eliminate all tendency to crack.

Several years probably will be required to carry the research program to consummation, says Comdr. D. Schmidtman, United States Coast Guard, secretary of the Ship Structure Committee.

Want To Do AEC Business?

HOW TO DO business with the Atomic Energy Commission is told in a new booklet available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, at 10 cents a copy.

Its title is "U. S. Atomic Energy Commission Contracting and Purchasing Officers and Types of Commodities Purchased." It answers these questions: What is bought by the AEC? Who buys it? Where are the procurement offices located?

The booklet is designed particularly for the use of small business firms.

Public Construction Budget

INTERESTED in public construction projects? You will find in the Congressional Record of Wednesday, Oct. 5, pages 14118-14124 amounts agreed on by House and Senate conferees for projects to be carried on by the Army Corps of Engineers during the current fiscal year. Total provide is \$664,178,190, compared with the budget request of \$772,458,220.

Cartel Talk Mounts in Western Europe

Pressure for trusts in steel and steel products heightened by economic dislocations stemming from currency devaluations. No important cartels yet formed

PRESSURE to form cartels in Western Europe is increasing. Talk of monopoly in steel and steel products spurred by the economic dislocations stemming from currency devaluations.

No important cartels have yet been created because of American objections, but European proponents will continue trekking to this country to gain approval. One of the most ambitious cartel projects since the war—for steel wire products—was actually put into operation by the British and Belgians, but it collapsed because Western Germany could not join. U. S. officials have thus far helped such trusts through their influence in the control of Germany; no major cartel could survive without the Ruhr participating.

Western Germany Crucial—Western Germany, then, is the key nation in the cartel question. Proponents of monopoly in other Western European countries have redoubled their efforts to bring the new German government at Bonn into the fold in the hope that Bonn might influence the Americans to modify their attitude toward the problem. Bonn officials are still predominantly anticartel. Industrialists favoring trusts argue this way: Cartels are necessary

as an interim measure to cushion the shock when the Marshall Plan ends in 1952. Despite the great benefits of ERP, European industry is still far behind the U. S. technologically and will be for some years to come. Cartels are like tariff walls to protect weak European industry until it can stand on its own feet to face U. S. competition.

Many Oppose Cartels—Many European business men—particularly steel consumers—strongly oppose cartels. They argue this way: Cartels artificially prop prices, discourage modernization, support the high cost producers, make prohibitive the investment of U. S. capital in Europe's industry. One reason why Europe is behind the U. S. technologically is because status quo conditions in industry were encouraged by prewar trusts. Let the inefficient operations die. Western Europe will benefit, not lose, from such deaths, just as the U. S. has gained.

One place where the whole matter will be thrashed out is before the International Ruhr Authority, the majority of whose membership will probably favor the cartel idea. French, Belgian, Luxembourgian, British and German members are all likely to be trust adherents. Only the influential U. S. representatives on this board, which has general supervisory powers over Ruhr industry, will probably oppose.

Need Ruhr Expansion in Coal

Custodians of the Ruhr coal mining industry—who face the knotty problem of regrouping German coal properties among about 12 new companies—estimate that a \$725 million expansion and modernization program is essential. About \$300 million of this could be financed by the mines themselves; the rest would have to be supplied from counterpart funds and outside private capital. This expansion program would include construction of homes for miners and erection of gigantic power plants on mine sites to utilize low-grade coal.

The last stockholders' meeting has been held of Vereinigte Stahlwerke, once the largest steel corporation in Europe. The company is being liquidated, and its few remaining units will be redistributed among newly formed companies, in accordance with Allied directives.



TRUCKS FOR ISRAEL: Part of the first major shipment of automotive products destined to ease the transportation shortage in Israel is lowered into the hold of the S. S. Expediter in New York. NEA photo

Production of the Volkswagen car will soon reach a daily high of 200 units, mostly of the more expensive and better finished export model now available for domestic buyers too. The company has spent \$360,000 for repairs since the war; all of this was financed from current profits. Once owned by the Nazi Labor Front under Robert Ley, the firm has been turned over by British custodians to the new German government who will hold it in trusteeship. It will be a public enterprise for the present, but no changes in management will occur.

U. K. Labor Deliberates

The British Trade Union Congress is still deliberating on its stand regarding devaluation and wages. Half of the 8 million workers it represents had pressed for wage boosts even before the devaluation.

The thorny dilemma TUC faces is this: How to appease its rank and file but still hew to the Labor government's wage stabilization policy? The group seeks some formula for raising the income of low-paid workers which is agreeable to workers and the government. Complicating the issue is the problem of seniority and craftsmanship. Rates are figured on these two factors to a greater extent than in the U. S. Any wage grant to low-scale workers might upset the delicate balance established for men with longer longevity or higher skills.

Britain has established world leadership in jet-powered transport planes, but U. S. aircraft companies have more experience in the design and development of rocket and jet propelled military aircraft types, a survey by Aircraft Industries Association discloses. In both the U. S. and Britain, jet aircraft developed are mostly experimental. Relatively few have been produced in quantity yet.

Because of the importance of dollar exports, organizers of the British Industries Fair are increasing the circulation of the London and Birmingham sections of the 1950 BIF catalog and diverting extra supplies to North American markets. Bulk distribution will take place in February so that overseas trade buyers—particularly American—will be able to plan their tour of the fair in advance.

Economic Crisis in France

Collapse of the Queuille cabinet was more than just another somersault in the French political circus. The ministerial crisis is largely an expression of threatening social crisis which has been smoldering beneath

the calm surface France has presented for nearly a year.

The French, despite rising production, have been experiencing a living standard lower than before the war. Moderate labor leaders have urged that workers should wait for prices to come down, should not demand wage increases. The cost of living did decline slightly until August, but now it's climbing again. This fact, plus devaluation, has exploded the calm. A new French government must tackle the problem. The Queuille ministers could not agree on the solution.

Hungary Drafts Five-Year Plan

A new five-year plan of development is being drafted by Hungary. On completion, the country's economy is supposed to be transformed from a mainly agricultural condition to one predominantly industrial. The plan foresees an increase of ingot steel output from the present 800,000 tons per year to 1.5 million tons in 1954. Production of pig iron would be boosted from 375,000 tons annually to 920,000 tons. This will necessitate construction of a new plant at Mohacs on the Danube and will include a coking facility.

Roumania Programs Expansion

Plans are being considered to increase Roumanian iron and steel production by reconstructing and modernizing the three existing blast furnaces and the 12 open-hearth furnaces. Two additional open hearths will be built, and an expansion of coking plant capacity is provided.

Turkey Seeks U. S. Loan

International Bank for Reconstruction & Development has sent a five-man mission to Turkey to examine three projects for which Turkey is seeking a loan. The projects are grain storage facilities; irrigation, flood control and electric power; and port construction and improvement.

New Bridge on Old Piers

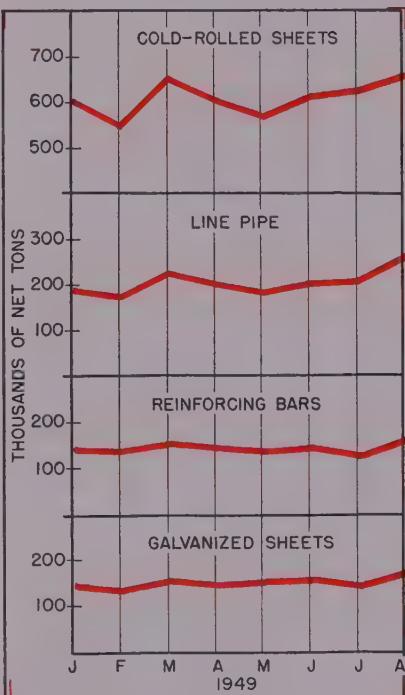
UNUSUAL feature of a construction project awarded to U. S. Steel's American Bridge Co. is to erect a new bridge alongside present spans and then move it onto the old piers.

Illinois Central Railroad awarded the contract for replacement of the old IC bridge which for 60 years has spanned the Ohio river at Cairo, Ill. When construction of each span is completed, the corresponding span of the old bridge will be cut free and the new section rolled into place. Old spans will be launched like a ship into the river. Individual spans, some longer than a football field, will be cut into scrap.

New Records for Year

Mill distribution of four steel products rises to 1949 peaks as pattern of demand shifts

NEW HIGH monthly levels for 1949 were set in August in mill distribution of four classes of finished steel products—cold-rolled sheets, line pipe, reinforcing bars, and galvanized sheets. Trends of these products this year are shown in the accompanying chart.



The 1949 monthly high of 658,522 net tons of cold-rolled sheets results largely from increased shipments to the booming automobile industry and helps put total distribution of that product in the first eight months of the year above that of any other product. The eight-month total of 4,881,045 tons of cold-rolled sheets constitutes 11.33 per cent of the 43,082,387 tons of all products distributed, the American Iron & Steel Institute reports. This was the first time this year the cumulative total for any product exceeded that of hot-rolled bars (including light shapes). Distribution of hot-rolled bars and light shapes through August totals 4,852,884 tons, or 11.26 per cent of all steel products shipped from mills.

Three-months Uptrend — Second highest monthly distribution of cold-rolled sheets was 649,701 tons in March. Distribution fluctuated during the first five months of the year and climbed in June, July and August.

Year's high point in line pipe dis-

tributed reflects high level of activity in installation of transmission line for oil and gas, particularly the latter. This high point, established in August, is 259,060 tons. Previous high for the year was 228,310 tons in March. Line pipe shipped by mill in the first eight months totals 1,655,944, equivalent to 3.8 per cent of all steel shipped by mills in that period.

Reflects Construction Pace — The year's new monthly high level set in August by shipments of reinforcing bars is a result of the heavy volume of construction under way. August shipments of reinforcing bars totaling 155,662 tons bring the eight months aggregate to 1,114,943 tons. Previous high month of the year was March with 150,230 tons.

The distribution of galvanized sheets reached the year's new monthly high of 174,088 tons in August largely because of the government's grain bin program. This tonnage represents 3.5 per cent of the total of 4,918,311 tons of all finished steel distributed by mills in August. Previous high month of the year was June with 158,401 tons. Mill shipments of galvanized sheets in the first eight months of this year total 1,195,114 tons.

Metal Treaters Elect Officers

OFFICERS elected for the coming year by Metal Treating Institute at its 17th annual meeting in Cleveland Oct. 14-16, are: President, Fred Heinzelman Jr., Fred Heinzelman & Sons, New York; and vice president Paul Seitz, Commercial Steel Treating Co., Cleveland. Retiring president of the institute is L. A. Lindberg, chairman, Lindberg Steel Treating Co., Chicago.

Elected to the board of trustees for two-year terms are: Michael Kober, Commercial Metal Treating Inc., Bridgeport, Conn.; Lloyd G. Field, Greenman Steel Treating Co., Worcester, Mass.; and C. Robert Dernhamer, Lakeside Steel Improvement Co., Cleveland. Next meeting of the institute will be at French Lick Ind., May 1-3, 1950.

Engineering Awards Made

ELECTION of Walter H. Aldridge president, Texas Gulf Sulphur Co., New York, to receive the John Fritz medal for 1949 is announced by the board of award. The award was established in 1902 and is jointly sponsored by the Founder Societies of civil, mining, mechanical and electrical engineers. It is presented no more often than once a year for scientific or industrial achievement in any field of pure or applied science. Previous winners include: Alexande

raham Bell, Edison, Orville Wright, arconi, Sperry, Hoover, Kettering. Recipient of the Daniel Guggenheim medal and certificate for 1950

Dr. Edward P. Warner. He is resident of the Interim Council of provisional International Civil Aviation Organization and has held many government posts in the aeronautical field. The award, created to honor persons making notable achievements in advancement of aeronautics, has been won by Orville Wright, Boeing, Douglas, Martin, Doolittle, Bell, rumman.

Industry Theme: Cut Costs

Industrial Research Institute, management association, tool engineers tackle problem

MANAGEMENT must find the means to counteract today's high costs of operation. This is the increasingly predominant theme wherever metalworking executives meet.

The Industrial Research Institute as told last week that one approach to the problem is through development of new products. American Management Association is sponsoring a meeting in Chicago Nov. 10 and 11 to consider means of reducing production costs in industry. American Society of Tool Engineers will hold an industrial exposition on cost-cutting next Apr. 10-14, in Philadelphia.

New Product Flow Vital

One of management's pressing problems is new products, the Industrial Research Institute heard Oct. 12. Maurice Holland, industrial research adviser, said the problem calls for integration of laboratory research, executive brains and salesmen's ideas to produce new industrial products and to maintain a continuous flow of new product ideas. In reviewing the strength and weakness of the current industrial research setup in the United States, Mr. Holland reported that a survey indicates gearing of research to sales is either proceeding too slowly

or not receiving concentrated attention to meet present needs. While research rates high with manufacturers, some of them are too impatient to get products on the market. Top management must devote more time and study to research, Mr. Holland said, for this phase of business is as important as sales and production.

MA Cost-Reduction Forum

About 1000 production executives are expected to attend American Management Association's cost-reduction meeting Nov. 10 and 11.

Six sessions of the conference, to be held at the Palmer House in Chi-

cago, will be devoted to cost reduction from the standpoint of improving shop practice, equipment policy, production control, mechanized inventory, determination of direct and indirect costs, employee incentives and other aspects of commonly encountered production problems.

Tool Engineers Tackle Costs

High labor cost is not the sole obstacle to reduction of manufacturing costs, American Society of Tool Engineers believes.

Two other stumbling blocks are: Lack of information in industry as to what is available in new cost-cutting methods and equipment, and a shortage of competent sales engineers to tell the story to industry. As one step to overcome these problems, the society will conduct an industrial exposition of new cost-cutting methods and equipment next April. The show will be especially designed for the smaller companies, on the theory that most large organizations are already fairly familiar with developments in this field.

NSIA Elects Officers, Trustees

ELECTED at the sixth annual meeting of the National Security Industrial Association were: Chairman of the board, Frank M. Folsom, president of Radio Corp. of America; president, James R. MacDonald, first vice president of General Cable Corp.

National vice presidents are: Earle W. Mills, executive vice president of Foster Wheeler Corp.; J. J. McDonnell, president of McDonnell Aircraft Corp.; and Harold Boeschenstein, president of Owens-Corning Fiberglas Corp.

Homer H. Ewing of the development department of E. I. du Pont de Nemours & Co. Inc. was elected secretary. John M. Fisher, vice president and treasurer of Standard Brands Inc., was elected treasurer. R. C. Simmons, general manager of the government department of Johns-Manville Sales Corp., was elected assistant secretary-treasurer.

Trustees for three-year terms expiring September, 1952, are:

George W. Codrington, vice president, General Motors Corp.; Frank M. Folsom; Walter Geist, president, Allis-Chalmers Mfg. Co.; P. Ralph Mork, executive vice president, Crane Co.; and C. J. O'Connor, president, Reichhold Chemicals Inc.—all of whom were re-elected. John M. Fisher; Howard B. Fonda, senior vice president, Burroughs Wellcome & Co. (U. S. A.) Inc.; Don G. Mitchell, president, Sylvania Electric Products Inc.; R. L. Maxwell, vice president, American Machine & Foundry Co.; H. F. Fischbach, president, Fischbach

& Moore Inc.; W. H. Swigert, president, Pacific Bridge Co.; Graham H. Anthony, chairman, Colt's Mfg. Co.; H. C. Turner Jr., president, Turner Construction Co.; C. C. Pearson, president, Glenn L. Martin Co.; and Thomas J. Watson Jr., vice president, International Business Machines Corp.

Trustees for two-year terms expiring September, 1951, are Earle W. Mills and A. M. Wibel, vice president, Nash-Kelvinator Corp.

Trustee for a one-year term expiring September, 1950, is R. A. O'Connor, president, Magnavox Co.

CALENDAR OF MEETINGS

Oct. 17-20, American Gas Association: Convention at Hotels Morrison, Palmer and Sherman, Chicago.

Oct. 17-20, Wire Association: Annual convention, LaSalle Hotel, Chicago. Association headquarters are at 300 Main St., Stamford, Conn.

Oct. 17-21, 31st Annual National Metal Congress and Exposition: Sponsoring societies are: American Society for Metals, American Welding Society, Metals Branch of the American Institute of Mining and Metallurgical Engineers and Society for Non-Destructive Testing, Public Auditorium, Cleveland. Secretary of American Society for Metals is W. H. Eisenman whose headquarters are at 7301 Euclid Ave., Cleveland 3.

Oct. 17-21, American Institute of Electrical Engineers: Annual fall general meeting, at Netherlands Plaza Hotel, Cincinnati. Institute headquarters are at 33 W. 39th St., New York.

Oct. 23-26, National Institute of Governmental Purchasing: Meeting, Hotel Cleveland, Cleveland.

Oct. 24-25, National Association of Suggestion Systems: National fall conference, Hotel Statler, Cleveland. Headquarters are at 122 S. Michigan Ave., Chicago 3.

Oct. 24-28, National Safety Council: National safety congress and exposition, Stevens, Congress and Morrison hotels, Chicago. Council headquarters are at 20 N. Wacker Dr., Chicago.

Oct. 26, American Iron & Steel Institute: Fourth regional technical meeting, Hotel Thomas Jefferson, Birmingham.

Oct. 26-27, National Conference on Industrial Hydraulics: Sheraton Hotel, Chicago. For details, write Otto J. Maha, Hannifin Corp., Chicago.

Oct. 26-28, National Metal Trades Association: 1949 convention, Palmer House, Chicago. Headquarters are at 122 S. Michigan Ave., Chicago 3.

Oct. 27-28, Forelaine Enamel Institute: 18th annual meeting, French Lick Springs Hotel, French Lick, Ind. Headquarters are at 1010 Vermont Ave., Washington 5.

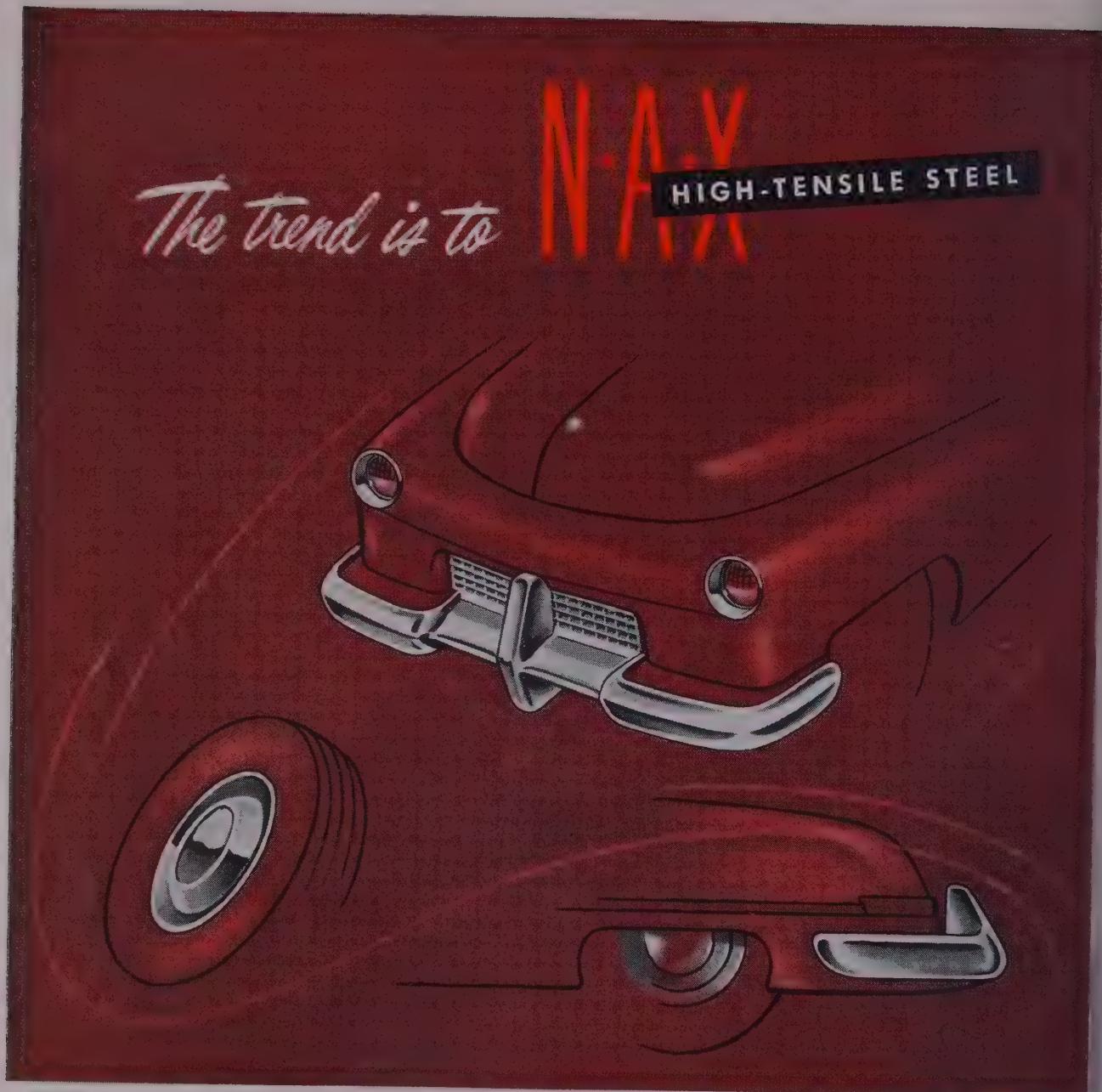
Oct. 28, Illinois Mining Institute: 57th annual meeting, Hotel Abraham Lincoln, Springfield, Ill. Institute headquarters are at 28 E. Jackson Blvd., Chicago.

Oct. 30-Nov. 2, National Tool & Die Manufacturers Association: Annual meeting, Hotel Statler, New York. Association headquarters are at 1412 Union Commerce Bldg., Cleveland.

Oct. 31-Nov. 1, American Machine Tool Distributors' Association: 25th anniversary meeting and banquet, Hotel Gibson, Cincinnati. Office of the secretary is at 505 Arch St., Philadelphia 6.

Nov. 1-5, Pacific Chemical Exposition and Pacific Industrial Conferences: Running concurrently at San Francisco Civic Auditorium.

Nov. 2, American Iron & Steel Institute: Fifth regional technical meeting, at the Waldorf-Astoria, New York.



Since 1940, when Great Lakes Steel pioneered the application of high-tensile, low-alloy steel to cold-stamped automobile bumpers, there has been a growing trend to N-A-X HIGH-TENSILE steel in the automobile industry.

Today, every car manufacturer is using the inherent better properties of N-A-X HIGH-TENSILE steel for some part of his automobile.

Bumpers and grilles—hoods and fenders—body panels and deck lids—frames and bracings—wheels and hub caps represent a few of many applications of N-A-X HIGH-TENSILE steel to the modern car.

N-A-X HIGH-TENSILE MEETS ALL REQUIREMENTS OF S.A.E. 950

GREAT LAKES STEEL CORPORATION

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
Unit of National Steel Corporation



Ford announces its new automatic transmission. Both Ford and Borg-Warner tooling up to produce it. Price to be not over \$150

DETROIT

FORD has taken the wraps off its new automatic transmission. The unveiling climaxes four years of continuous experiment and test, during which time dozens of different designs were put through their paces. Developed in co-operation with engineers of Borg-Warner Corp., Munster, Ind., under general supervision of Harold T. Youngren, Ford vice president and director of engineering, the device combines a single-stage torque converter with multiplication factor over 2 to 1 and a three-speed planetary gear train. Tooling for production is now going ahead by both Ford and Borg-Warner but the first units will not be available for installation on Ford and Mercury models before next summer. Price: not over \$150.

Three Elements—The torque converter comprises three bladed elements—a drive or pump member, the output or turbo member, and a reactor member which at a certain speed is locked out of action, making fluid coupling out of the converter. Pump and turbine are of stamped

steel sections, how assembled Ford will not say as yet, but it is likely they are mechanically locked and either welded or hydrogen brazed. Reactor is of die-cast aluminum. All three are contained in a cast aluminum inner housing, suitably finned for air cooling. An outer housing is of cast iron, with ports allowing circulation of air around the inner housing, thereby dispensing with the need for oil cooling which is standard on other types of automatic drives.

Gear Sets Simplified—Hydraulically operated gearbox, working in conjunction with the converter, comprises two input sun gears, an output ring gear and the necessary meshing pinions to form a three-speed and reverse gear set operated by two bands and two multiple-disk clutches through a valve body and speed-conscious governor. One of the clutches is constantly engaged during all forward driving. Patterned after the GM Hydra-Matic drive, the gear sets are simplified: Two planetary units are used against three in the Hydra-Matic.

Selector quadrant on the steering

wheel has five positions, from left to right: P, R, N, DR and LO (Parking, Reverse, Neutral, Driving Range and Low Range.) This differs from other selectors in that the shift from reverse to driving range is through neutral, facilitating parking and rocking of the car to pull out of ruts or snow. The car is held firmly in parking position by engagement of a series of dogs on a ring gear, eliminating danger of breakage occasionally encountered in use of a pawl.

How It Works—Starting ordinarily is done automatically in the intermediate gear range, 1½ to 1, assisted by the torque converter which has ratio of better than 2 to 1, or the equivalent of 3 to 1 overall ratio. Automatic changeover to top gear is obtained anywhere from 15 to 60 mph, depending upon the throttle setting. Thus, only one automatic shift is used, but it is still possible to slow the engine down by the use of low rear axle gear ratio (a little over 3 to 1) so that engine speeds are practically equivalent to overdrive in the top or cruising gear. A shift down to intermediate gear is possible at any time below 50 mph to give a step-down of 1½ to 1 for acceleration or hill climbing, by depression of the accelerator pedal. Low gear of approximately 2½ to 1 is reserved for exceptional performance requirements and where heavy gradients are encountered, or for down-hill braking. Engine may be started by pushing the car up to a speed of 15-20 mph.

Expect Wide Acceptance—Both Ford and the Warner gear division of Borg-Warner are tooling for making the transmission, indicating that a high degree of acceptance is expected from Ford and Mercury buyers. The question of whose transmission it is will have to wait for future determination as the Ford and B-W interests are pretty thoroughly tangled right now. At any rate, Mr. Youngren believes "we have gone a long way in this design to put what we consider a 'no compromise' transmission in the hands of the public at a reasonable price."

Loan Arouses Auto Industry

APPROVAL of the \$34.4 million RFC loan for Kaiser-Frazer, to bolster working capital and provide funds for tooling several new lines of passenger cars, touched off a barrage of speculation around Detroit.

Stockholders of General Motors, Chrysler and other motor companies,



PARIS AUTO SHOW: The 36th Paris International Auto Show ends this week at the Grand Palais Exhibition Hall. General view shows a wide variety of new models. The ten-day show exhibited cars manufactured in practically every country of the world. NEA photo

after thinking the matter through, wonder whether they, as taxpayers, are not actually subsidizing their competition. Here they reason, is a substantial chunk of public funds being dished out to permit a competitor to obtain machinery and tools to build a new product which, if it is to sell at all, will have to draw customers who might otherwise buy a different make.

Even employees of the old-line companies are scratching their heads and wondering if they, again as taxpayers, are not actually subsidizing jobs for several thousand people, perhaps at the expense of their own future security.

Three Cheers—Cheers resounded at Willow Run as news of Henry J.'s success at Washington filtered through. He had even secretly taken a mockup of one of the new models with him, to impress the loan agency officials. No one, however, seriously thought he would be turned down. For one thing he had played ball with the CIO in granting the 10-cent pension package for his Fontana steelworkers, and he has returned a few million of his \$90 million RFC loan on the California steel plant.

But this new kind of financing doesn't ring true in the motor industry's thinking. Opinions are voiced to the effect that when a company needs money the usual recourse is to bank loans or stock issues which are not difficult to arrange if the credit risk is good. Of course, K-F has done this in the past, the most recent step being a \$25 million line of credit negotiated with the Bank of America and the Mellon National Bank. Now it is assumed the RFC funds will be used in part to retire any of this credit which has been used. The company has issued no details of any breakdown of the \$34.4 million, although in Washington it was indicated \$4.4 million would be used for tools to produce a proposed new smaller car, \$18 million for retooling medium and higher-priced models, and \$12 million for working capital. The loan is on a ten-year basis, with interest rate 4 per cent, not exactly cheap capital.

Pledges Widespread Assets — The loan is being secured by pledging of the widespread Kaiser assets in a number of other companies, such as Permanente Metals, etc., and by a mortgage on both the Willow Run plant, and the new tools and equipment. As for the plant, K-F has paid only \$1,510,000, or 10 per cent of the agreed purchase price, to the War Assets Administration, so it will be another nine years before that debt is erased. The WAA is said to have revised its sale agreement so it will

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,996
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	678,092	478,186
September	647,000*	437,181
October		516,814
November		495,488
December		514,337
12 mos.		5,549,323

* Preliminary.

Estimate for week ended:

	(Same week)	
	1949	1948
Sept. 24	158,007	98,394
Oct. 1	151,593	121,475
Oct. 8	148,072	119,398
Oct. 15	145,000	123,185

Estimates by
Ward's Automotive Reports

have a mortgage secondary to that of the RFC.

When news of the loan became public, K-F stock promptly jumped from 4 to 5 1/8.

Look to K-F for Business

Tool, die and machinery men lost no time in beating a path to the K-F purchasing department, once they realized the government dough would be ready to lay on the line. Although mockups of the new smaller car had been completed in plants of the Budd Co., little had been done in the way of actual placing of tool and die business. Six months probably will be required to push through such a program, so it is not likely the new Kaiser will be on the market before next April, if then.

Kaiser: RFC's Biggest Debtor

Figuring in the Fontana deal, the latest loans would put Kaiser about \$140 million into the RFC till, making him its largest single debtor. Total RFC outlays to all industry are said to be on the order of \$450 million. Of course, the K-F loan looks pretty sound in view of the profitable position of many of his enterprises. Permanente Metals, for example, has always done well and, according to recent comment by a leading investors' service, has been guaranteed orders for 40 per cent of all aluminum to be stockpiled by Metals Reserve Corp. in the next 25 years.

Permanente Cement also has been well into the black ink, and, except for this year, the Willow Run auto plant has made good money. It lost \$8.1 million in the first six months of this year, but earned \$10.4 million in 1948, about \$19 million in 1947.

RFC Help for K-F Dealers?

Next caper in the RFC-Kaiser picture is understood to be a further \$15 million loan to dealers to help them finance cars between the factory and the ultimate purchaser. This is another new twist, other dealers being required to handle such financing through conventional types of commercial paper. The facetious comment that the next step will be RFC loans to car buyers must be brushed aside.

Pontiac Moves Up Preview

PRESS PREVIEW of 1950 Pontiac models will be held Nov. 10, and details of the new line will be announced publicly Nov. 27. These dates have been moved ahead from original planning, possibly because of the steel strike but more probably because the 1949 schedules were run off on time with none of the delays encountered a year ago. Changes are not expected to be numerous, the present body types carrying through another year. Grilles and decorative treatment will be restyled. You can also look for an increase in engine displacement to provide added power.

Packard President Resigns

RESIGNATION of George T. Christopher as president of Packard, effective Dec. 31, occasioned no surprise to those who had talked with him in recent months. In the past 15 years, he has brought the company to the pinnacle of its 50-year history, and during the war years directed a superb job of aircraft engine production.

Packard production this year will top all past records and the plant and dealer organization is there to turn out 200,000 units a year.

Although only 62, Mr. Christopher doubtless feels the time to leave when things are at the top, for the ride down the next few years may be a rough one for everybody, including Packard. Sixty-four-year-old Hugh Ferry, secretary and treasurer, has been named executive vice president and will work closely with Mr. Christopher over the next couple of months as he cleans his desk and prepares to focus his attention on what can be accomplished by further mechanization of his 750-acre "golden plot" at Tipp City, O.

Nothing Rolls Like a Ball

You couldn't buy
a better bearing !



NEW DEPARTURE BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

BUYING...

... Rome Cable Exercises Option

Rome Cable Corp., Rome, N. Y., has exercised an option to acquire assets of Andersen-Carlson Mfg. Co., Torrance, Calif.

H. T. Dyett, chairman of the board of Rome Cable, says the transaction will be completed shortly after Jan. 1, 1950. Rome Cable will acquire Andersen-Carlson assets through an exchange of certain shares of Rome Cable common stock and will assume the California firm's liabilities. Rome Cable has been selling Andersen-Carlson's output since 1948.

BOUGHT...

... Interlake Chemical Sold

President E. L. Clair of Interlake Iron Corp., Cleveland, says his company has taken over activities and facilities of Interlake Chemical Corp., Cleveland.

The coal tar chemicals and synthetic and plastic resins business of Interlake Chemical will be continued by Coal Chemicals Division of Interlake Iron.

... Van Auken Purchased

Purchase of Van Auken Inc., Ferndale, Mich., by Penn-Ohio Steel Corp., Birdsboro, Pa., will involve operation of Van Auken as a subsidiary of Penn-Ohio Steel. J. B. Montgomery, former president of Empire Steel Corp., Mansfield, O., becomes president of Van Auken.

The all-cash transaction includes the Van Auken plants in Detroit and Mt. Clemens, Mich., which manufacture automobile radiators and bumper guards. Plans are being made to move Van Auken facilities to Birdsboro.

... Shook Bronze Bought Out

Randall Graphite Bearings Inc. purchased the foundry and machine shop of Shook Bronze Corp., Lima, O. Randall will move its Chicago plant to Lima.

Production at the Lima plant, presently to be known as Shook Bronze Division of Randall Graphite Bearings, was begun Oct. 10. For over 30 years Randall has handled its line of patented oil reservoir graphited bronze bearings and allied products. The Shook foundry was thoroughly modernized in 1946.

... Baldwin Buys Defiance Presses

In still another industry alignment Baldwin Locomotive Works, Philadelphia, bought the press business of Defiance Machine Works Inc., Defiance, O.

Purchase includes all models of Defiance preform presses which will be manufactured under the Baldwin-Defiance name at the Baldwin Eddystone, Pa., plant. Primary object of the purchase was to acquire an established line of small mechanical presses to supplement the existing line of Baldwin presses to offer better service to the plastics industry. Defiance Machine Works next year observes its 100th anniversary as a manufacturer of production machinery.

BUILDING...

... New Wrinkle Pilot Plant

New Wrinkle Inc., Chicago, is completing equipment for its new plant at Dayton, O., for production of basic vehicles used in manufacture of Wrinkle finishes. Construction might permit acceptance of orders for shipment as early as Jan. 1, 1950.

Through use of these new products, the industrial finishes manufacturer will be able to produce uniform Wrinkles without further cooking in its plant. Manufacturer will only have to add dryers and pigment, then package the ready-to-use product. Inherent characteristic of Wrinkle finishes lies in the dry. As the surface of the finish on aluminum castings, dries, it results in a softer portion underneath. After drying is completed, the surface expands and causes folds according to a definite pattern.

BUILT.....

... By-Product Coke Ovens

Complete rebuilding from ground up of its No. 4 battery of 58 by-product coke ovens at a cost of \$1,150,000 has been accomplished by Woodward Iron Co., Birmingham. Actual time to rebuild was a little under 12 months. The battery was built in 1917 and had been in operation continuously for over 30 years.

... Clark Completes Factory

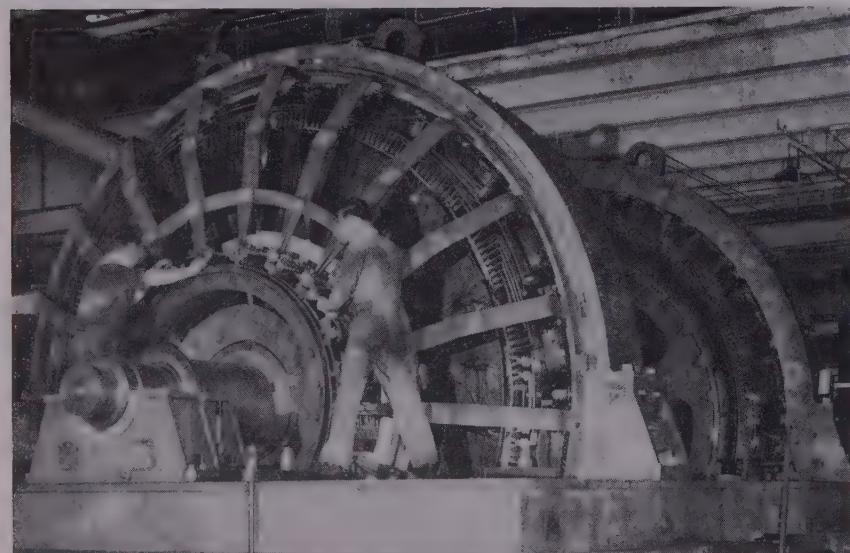
Entirely new factory at Jackson, Mich., has been completed by Clark Equipment Co., manufacturer of materials handling and automotive street railway equipment.

New plant will bring production of Clark's line of transmissions, farm tractor drives, gears and forgings under one roof. The building was a major undertaking in the company's overall expansion program. Executive offices of the company are at Jackson, Mich.

... Patterson Opens Plant

Patterson Foundry & Machine Co., East Liverpool, O., opened its plant at Toronto, Ont., erected by the company's subsidiary, Patterson Foundry & Machine Co. (Canada) Ltd.

New plant has a floor area of 100,000 sq ft and is fully equipped to manufacture the company's complete line of industrial processing machinery and equipment. Besides these facilities the plant will maintain a process engineering division for design of complete or partial process systems and will assist research staff of operating companies in development of various processes.



FOR KAISER IN FONTANA: Two huge drive motors to be installed at Kaiser Steel plant in Fontana, Calif., are tested at the General Electric Co., Schenectady, N. Y. They will be added to an existing roughing mill of the first continuous hot strip mill on the Pacific Coast. NEA photo

Briefs

Paragraphs on developments of interest and significance within the metalworking industry

Electro-Motive Division of General Motors Corp. concluded an agreement with Nydqvist & Holm Aktiebolag, Trollhattan, Sweden, for manufacture of diesel-electric locomotives. The Swedish firm will market in Scandinavia and overseas territories diesel-electric locomotives embodying GM's 567B locomotive diesel engine and other transmission components. Mechanical and some electrical equipment manufactured by Nydqvist & Holm and other Swedish firms will go into the locomotives.

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aldwin Locomotive Works, Philadelphia, will build three 88,000-hp hydraulic turbines for the Garrison Dam on the Missouri river, 75 miles north of Bismarck, N. D. Order was received from the Corps of Engineers at Bismarck. Price, including spare parts, is \$2,640,000.

—o—

acu-Blast Co. Inc., San Mateo, Calif., has established three regional offices: Mr. David G. Shipley is manager of one in South Gate, Calif.; Bert B. Jarl is in charge of one in New York; and James H. Turnbull is regional manager in Baltimore.

—o—

minkey & Haas, a company which handles abrasives, cutting tools and industrial diamonds, has been formed in Chicago.

—o—

llis-Chalmers Mfg. Co. marked the 50th anniversary of the firm's Boston Works with a three-day program. Officers and directors toured the plant. An open house for plant employees and their families also was held.

—o—

Surndy Engineering Co. Inc., New York, signaled its entrance into the automotive industry by introduction of a line of packaged electrical connectors. Company offers its Hydent instant-type connectors for automotive electrical systems.

—o—

waukee Power Equipment Co. was purchased by A. J. Kempfert from John V. Coughlin. Firm rents heavy equipment on a day-to-day basis and distributes industrial and construction equipment and tools.

—o—

Steel or Bronze Piston Ring Co., Indianapolis, announces a new series of "Non-Breakable" piston rings made of stainless steel which main-

tains tension under excessive temperatures and is corrosion resistant. Besides being free from distortion, the rings are said to reduce friction and wear by providing a "dissimilar" metal for the rubbing surfaces and to increase compression efficiency by a near-constant expansion factor that permits closer tolerances between ring and cylinder wall.

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Tin Research Institute Inc. has been organized to provide free technical service to users of tin in the U. S. Technical experts are available for consultation and practical assistance either at the institute or at consumer's plants. Office is in Columbus, O.

—o—

Interstate Commerce Commission authorized a merger of three short-line railroads controlled by U. S. Steel Corp.: Pittsburgh, Bessemer & Lake Erie; Meadville, Conneaut Lake & Linesville; and Bessemer & Lake Erie. These roads, with 192 miles of track in Pennsylvania and Ohio, will consolidate under the name, Bessemer & Lake Erie Railroad.

—o—

Welded Construction Engineering Co. and **Cleveland Steel Barrel Co.**, both of Cleveland, received more than \$1 million worth of government orders. Welded Construction will make \$400,500 worth of dollies to be used in maintenance of B-36 and B-29 bombers; Cleveland Steel Barrel has a \$600,000 order for steel drums for the Army.

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John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire products, opened a new office and warehouse in Cincinnati. W. K. Hanna is manager.

—o—

Aluminum Ladder Co., Worthington, Pa., will sell its aluminum straight, step, extension and fire ladders under the tradename "Alco-Lite." Company also manufactures aluminum gangways.

—o—

Berger Mfg. Division of Republic Steel Corp. opened its Indianapolis warehouse to serve jobbers of sheet metal, building products and equipment products like shelving, kitchen cabinets, office equipment and tool room equipment.

—o—

Weatherhead Co. will build a \$65,000 addition to its St. Thomas, Ont., plant. Company manufactures parts



PRODUCT DISPLAY: To increase employee understanding and appreciation of important roles throughout the industry of the things they make, SKF Industries Inc. started a series of customer product displays. Two workers in the firm's Philadelphia cafeteria pause to look at a cutaway model of a Curtiss-Wright Cyclone engine equipped with bearings they helped to make

for automobiles, refrigerators and oil burners.

—o—

Iron Lung Ventilator Co. is the new name for Powermatic Ventilator Co., Cleveland, makers of Iron Lung roof ventilators, intake units and related items.

—o—

Washington Aluminum Co., Washington, manufacturers of aluminum marine equipment in Baltimore, appointed M. J. Gigy & Associates, San Francisco, as Pacific Coast agent.

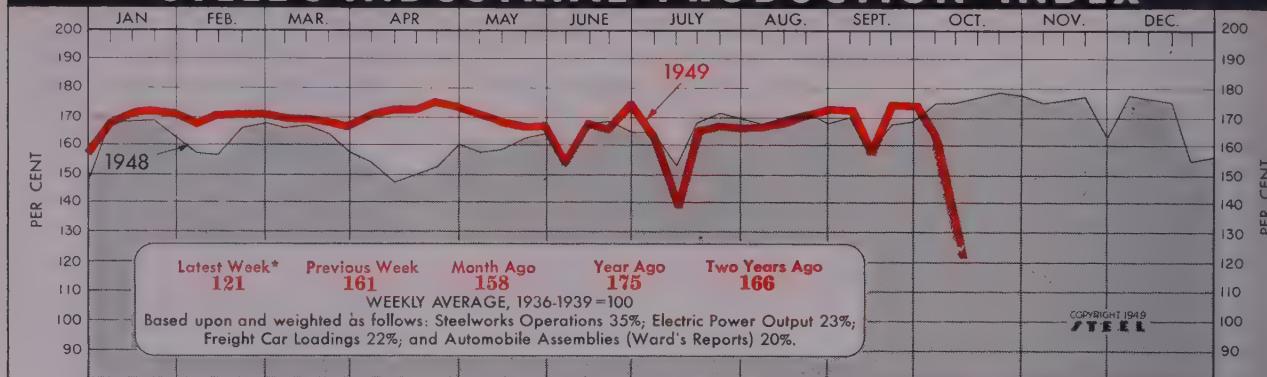
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Hoffman Bros. Inc. is a newly incorporated general contracting firm in Milwaukee. Office is in the firm's Tenth street warehouse. Officers are Joseph Hoffman, president; Hugo Hoffman, vice president; and Roland N. Hippert, secretary-treasurer.

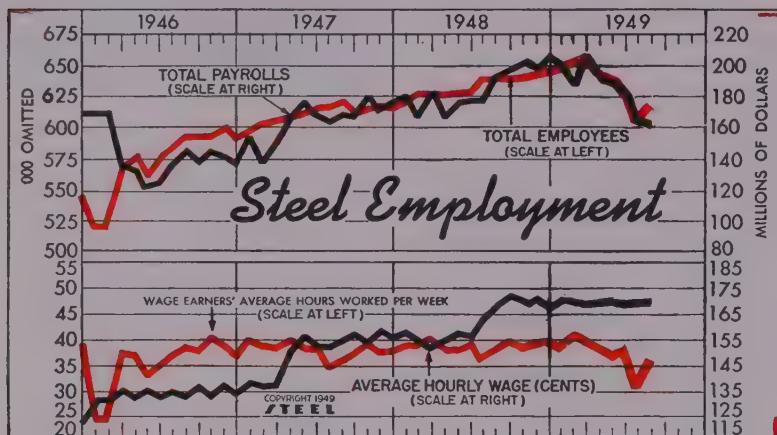
—o—

Hunter Spring Co., Lansdale, Pa., is running its third season of technical courses offered to engineers, inspectors, purchasing agents and designers on the subjects: Quality Control by Statistical Methods and Modern Spring Design. For details, write to Ralph P. Coleman Jr., Hunter Spring Co., 1 Spring Ave., Lansdale, Pa.

STEEL's INDUSTRIAL PRODUCTION INDEX



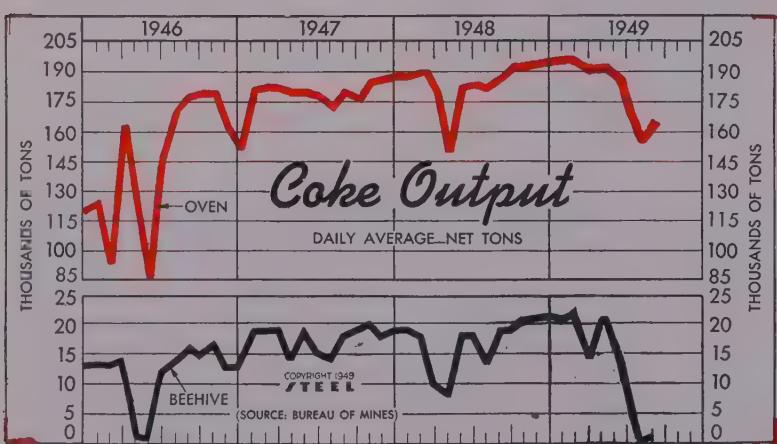
* Week ended Oct. 8 (preliminary).



Steel Employment

Employees† (000)	Total Payrolls (millions)		Hourly Wages† (cents)			
	1949	1948	1949	1948	1949	1948
Jan.	650	622	\$202.1	\$180.2	171.3	157.3
Feb.	653	626	189.8	167.6	169.6	155.1
Mar.	652	629	207.2	183.0	168.5	154.8
Apr.	647	626	191.9	168.5	168.8	155.1
May	637	628	188.4	175.3	169.7	157.7
June	625	634	181.8	179.5	168.4	156.9
July	610	641	160.3	179.8	169.9	164.5
Aug.	603	645	175.6	193.8	168.2	168.9
Sept.	641	....	199.4	....	171.8	....
Oct.	644	....	201.7	....	169.9	....
Nov.	646	....	199.8	....	172.1	....
Dec.	643	....	205.8	....	169.4	....

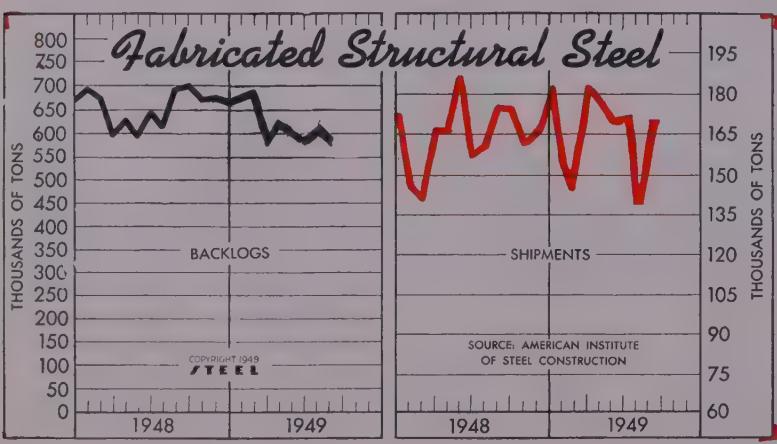
† Monthly average.



Coke Output

Bureau of Mines
(Daily Average Net Tons)

	Oven		Beehive	
	1949	1948	1949	1948
Jan.	196,000	189,191	20,121	19,588
Feb.	195,551	190,098	22,261	18,625
Mar.	192,183	182,340	14,030	10,435
Apr.	192,019	149,692	21,098	8,235
May	187,040	184,568	17,017	18,651
June	174,748	187,200	8,931	18,700
July	158,407	184,286	776	14,032
Aug.	165,884	188,468	1,460	19,751
Sept.	192,090	....	....	19,616
Oct.	192,440	....	....	20,083
Nov.	193,565	....	....	20,341
Dec.	195,670	....	....	20,588
Ave.	185,634	....	....	17,391



Fabricated Structural Steel

(000 Tons)

	Shipments		Backlogs			
	1949	1948	1947	1949	1948	1947
Jan.	152.7	146.4	140.6	675	692	661
Feb.	145.9	141.6	136.1	683	673	656
Mar.	185.9	167.0	137.8	582	597	614
Apr.	179.2	166.7	157.4	628	630	632
May	171.1	186.9	155.0	599	593	628
June	172.3	157.1	151.9	583	647	634
July	143.6*	160.8	169.9	605	613	661
Aug.	172.2	176.3	158.0	583	691	639
Sept.	175.0	184.3	....	698	648	....
Oct.	164.0	196.1	....	669	649	....
Nov.	189.8	175.0	....	673	645	....
Dec.	182.4	173.0	....	670	671	....
Total	1,993.9	1,915.1	....	....	....	....

* Revised.

The Business Trend

IMPORTANCE of the steel industry in the nation's economy is shown graphically in the chart atop the facing page. The first full week's loss of steel production as result of the steelworkers' strike cut STEEL's industrial production index from 161 per cent of the 1936-1939 average to 121 per cent in the week ended Oct. 8. The drop is even more severe than the 10 points indicate, for before the plunge the index already was below normal.

STEEL—In the first full week of the latest steel strike the nation's ingot rate fell to 7.5 per cent of capacity, lowest point since the strike period in February, 1946. Not all of the steel mills are strikebound (see STEEL, Oct. 10 issue p. 88) but all of the largest producers have been idled by the walkout.

AUTOMOBILES—Only one automobile builder has found it necessary to cut its assembly rate thus far. In the week ended Oct. 8 the industry's outturn was 48,072 passenger cars and trucks, about 3500 units below the preceding week. Truck assemblies, particularly in the heavier models, may be affected by walkouts in plants of components suppliers who have contracts with United Steelworkers of America. Assembly schedules are being eased by most automobile builders by eliminating overtime. Result: Average daily assembly rate in U. S. plants dropped to 28,130 units in the first October week compared with the industry's alltime peak of 29,460 reached in September.

POWER—Electric energy sales to ultimate customers totaled almost 20 billion kwhr in July, 3.1 per cent

more than in the same month last year. Edison Electric Institute totals show that revenue from these sales was \$375.4 million, an increase of 7.8 per cent over July, 1948.

RAILROADS—American Railway Car Institute says that domestic freight car deliveries totaled 6141 in September. August production was 7178 cars. Car builders completed 3936 cars in September and 2205 were built in railroad shops. Production of the leading types was: Box, 1362; hopper, 2121; gondola, 1684; refrigerator, 351; tank, 368.

COAL—Bituminous coal output was about 1.8 million net tons in the week ended Oct. 1. This coal came from non-union mines and those operated by the Progressive Miners union. Mines employing UMW miners were strikebound. In the corresponding week last year production was about 12 million tons.

CONSTRUCTION—New construction put in place in September was valued at \$1.9 billion, reaching a seasonal peak at about the same level as last year. For the first nine months of 1949, value of new construction amounted to \$14 billion, 1 per cent more than the total for the same period last year, says the Commerce Department's Construction Division. Many types of private construction have dropped below the levels of a year ago but public construction has more than made up the difference.

PRICES—Bureau of Labor Statistics wholesale price index rose 0.1 per cent in the week ended Oct. 4 to 152.5 per cent of the 1926 average.

BAROMETERS of BUSINESS

	LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
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INDUSTRY	Steel Ingot Output (per cent of capacity)†	7.5	70.0	85.0	97.0
	Electric Power Distributed (million kilowatt hours)	5,350‡	5,521	5,258	5,842
	Bituminous Coal Production (daily av.—1000 tons)	304	337	1,342	2,009
	Petroleum Production (daily av.—1000 bbl)	4,800‡	4,891	4,851	5,535
	Construction Volume (ENR—Unit \$1,000,000)	\$152.4	\$163.9	\$146.5	\$170.2
	Automobile and Truck Output (Ward's—number units)	148,072	151,593	123,806	119,938

*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons. ‡Preliminary.

TRADE	Freight Carloadings (unit—1000 cars)	608†	658	624	892
	Business Failures (Dun & Bradstreet, number)	182	181	148	107
	Money in Circulation (in millions of dollars)‡	\$27,476	\$27,348	\$27,589	\$28,802
	Department Store Sales (changes from like wk. a yr. ago)‡	—8%	—8%	—5%	none

†Preliminary. ‡Federal Reserve Board.

FINANCE	Bank Clearings (Dun & Bradstreet—millions)	\$13,589	\$13,071	\$12,640	\$14,150
	Federal Gross Debt (billions)	\$256.6	\$256.6	\$256.4	\$252.3
	Bond Volume, NYSE (millions)	\$13.4	\$13.6	\$9.7	\$15.2
	Stocks Sales, NYSE (thousands of shares)	6,883	6,179	3,201	3,484
	Loans and Investments (billions)†	\$66.1	\$66.5	\$65.8	\$61.9
	United States Gov't. Obligations Held (millions)†	\$37,004	\$37,874	\$37,307	\$32,559

†Member banks, Federal Reserve System.

PRICES	STEEL's Weighted Finished Steel Price Index††	152.52	152.52	152.52	151.86
	STEEL's Nonferrous Metal Composite‡	172.2	175.9	180.3	220.7
	All Commodities†	152.5	152.4	153.0	166.1
	Metals and Metal Products†	170.1	170.3	169.2	172.3

†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.

Men of Industry



CHARLES E. WALKER JR.



E. W. ALLISON



ARTHUR C. KREUTZER

Charles E. Walker Jr. has been elected vice president, **Dravo Corp.**, Pittsburgh. He will continue as secretary and director of industrial relations of the corporation, which positions he has held since 1944. He joined Dravo in 1933 as a member of the accounting department.

—o—

Verne E. Cornell, general manager of the Ackermann plant, **Wheeling Steel Corp.**, Wheeling, W. Va., has been appointed chief engineer of the corporation. **James F. Baxa**, assistant general manager, Ackermann plant, has been appointed general manager of that plant. **M. E. Marsh**, general manager of the Wheeling factory, has been appointed assistant general manager of all the company's factories, and is succeeded by **R. L. Jolly**, formerly assistant general manager, Wheeling factory. Mr. Jolly is succeeded by **H. V. Corcoran**. **S. C. Wood** and **K. P. House** have been appointed assistant managers of the Tubular Sales Division.

—o—

Appointment of **J. R. Connell** as assistant purchasing agent is announced by **Babcock & Wilcox Tube Co.**, Beaver Falls, Pa. Mr. Connell has been in charge of the purchasing department of the company's Welded Tube Division. Prior to association with B & W he was with the sales and metallurgical divisions of Carnegie-Illinois Steel Corp.

—o—

T. H. Cable has been appointed to the sales department, central staff, of **Koppers Co. Inc.**, Pittsburgh. He has been eastern advertising manager for Westinghouse Electric Corp. for the last three years with headquarters in New York.

E. W. Allison has been elected secretary-treasurer of **Detrex Corp.**, Detroit. Associated with the company since 1941, he has progressed through the legal department and the positions of assistant secretary and secretary. He retains his duties as secretary with supervision over the legal and personnel departments. Mr. Allison, prior to joining Detrex, spent six years with a Detroit law firm after graduation from the University of Michigan Law School. **G. E. Powers**, whom Mr. Allison succeeds, has retired after 25 years with the company.

—o—

Harold Von Thaden has been elected corporation vice president, **Hewitt-Robins Inc.**, Buffalo. **Benjamin T. Moffatt** has been elected a director, and **John Hoyt** as assistant to the president. Mr. Van Thaden has been vice president and general manager of the Engineering Division. Mr. Moffatt, a corporation vice president since 1941, has been placed in charge of sales. Mr. Hoyt was with the company's Engineering Division and its Robins conveyors unit for many years.

—o—

Nils Anderson Jr., formerly vice president, Chemical Division, **Borden Co.**, New York, has joined **Debevoise-Anderson Co.**, New York, as vice president. Before the war he was with Bakelite Corp., and later became a director of Debevoise-Anderson, a post he still holds.

—o—

N. J. McCartney, formerly sales manager, **Gould Storage Battery Ltd.**, Kingston, Ont., **National Battery Co.** subsidiary, has been promoted to vice president in charge of sales in Canada.

Arthur C. Kreutzer has been appointed managing director, **Liquefied Petroleum Gas Association Inc.**, Chicago. He will assume the duties of **Howard D. White**, executive vice president, who resigned effective Oct. 31 to become associated with the newly organized **Perlite Development Corp.**, Albuquerque, N. Mex., as owner and officer. Mr. Kreutzer has been counsel and secretary to the association since 1946.

—o—

General Refractories Co., Philadelphia, announces the following appointments and transfers of salaried personnel: **Roger W. Braden**, former manager, Detroit warehouse, has been reassigned as manager, New York warehouse; **DeWitt C. Clement Jr.** transferred from the estimating department to the New York warehouse as a member of its sales force; **Alan R. Eakins**, transferred from the estimating department to the New York warehouse sales force; and **Richard H. Lightfoot**, transferred from the New York warehouse to the New York district sales office.

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W. C. Stolk, recently elected executive vice president, **American Can Co.**, New York, has been made a director to succeed **James B. Taylor**, retired because of ill health. Mr. Taylor was a member of the board for 27 years.

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Alan Ede has been appointed resident salesman for **Kaiser Steel Corp.**, with offices in Stockton, Calif.

—o—

Michael J. Phillips has been appointed general manager of the newly formed Industrial Division, **Greer Hydraulic Inc.**, Brooklyn, N. Y. In his new post Mr. Phillips will supervise pro-



CHASER LIFE INCREASED 50%

Sun Cutting Oil Improves Quality of Threads, Steps-up Pipe Nipple Production

Operation: Threading 4" pipe nipples

Machine: Landis Threading Machine

Material: 4" galvanized welded steel tubing
SAE 1025-1040

Speed: Threading 1½" on each end of about
300 pieces per 8-hr. day

Chaser Life: 3 days before resharpening

Cutting Fluid: Sun Cutting Oil 31W

A manufacturer threading pipe nipples was not getting satisfactory finished threads with the cutting fluid in use. Chaser life was abnor-

mally short, resulting in excessive downtime and high percentage of rejects, with consequent loss of production.

Changing to Sun Cutting Oil 31W, this shop increased chaser life 50 percent, and reports that "the threads are the best we ever made." With rejects practically eliminated and downtime for changing chasers reduced to the absolute minimum, production has greatly increased.

Sun Cutting Oil 31W is a dark, free-flowing, sulphurized oil. It is recommended for heavy duty jobs where an emulsified cutting oil is not suitable. For further information about Sun Cutting Oils or other "Job Proved" Products for the metalworking industry, call or write the nearest Sun Office. The services of a Sun Engineer are available without obligation.

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SUN PETROLEUM PRODUCTS
"JOB PROVED" IN EVERY INDUSTRY



duction and marketing of Greer hydropneumatic accumulators and other hydraulic components for industry.

—o—

Richard H. Bancroft has been ap-



RICHARD H. BANCROFT

pointed executive engineer, **Perfect Circle Corp.**, Hagerstown, Ind., assuming the position left vacant by the retirement of **Macy Teetor**. **Dan Teetor**, who has been acting head, Engineering Division, since Macy's retirement in September, 1946, continues as vice president and an active member of the executive committee. Mr. Bancroft, associated with Perfect Circle since 1931, has been castings plant manager for the corporation, in which position he was in charge of both the corporation foundry at New Castle, Ind., and the sleeve castings plant at Richmond, Ind. **Dallas F. Lunsford** replaces Mr. Bancroft as head of the foundry, and **Robert C. Myers** was named to succeed as head of the sleeve castings plant.

—o—

William P. Gobeille has been appointed superintendent of the Milwaukee plastics plant of **Nash-Kelvinator Corp.** He joined the corporation last year as assistant manager of the plastics plant, after eight years of experience in the manufacturing field. He served as works manager, Cruver Mfg. Co., and held sales and engineering positions with a Milwaukee metalworking firm and a Chicago manufacturer of industrial sewing machines.

—o—

E. Richard Walter has been appointed mid-western sales representative, Plastic Metals Division, **National Radiator Co.**, Johnstown, Pa. He will have charge of sales of metal powders in Ohio, Michigan, Indiana, Illinois, Missouri, Iowa, Wisconsin and Minnesota, and will have headquarters

in Chicago. He goes to Plastic Metals from Powdered Metal Products Corp., Chicago.

—o—

Clarence L. Holmberg, since 1946 manager of the order division of the sales department of **Inland Steel Co.**, Chicago, has been appointed superintendent of business procedures at the company's Indiana Harbor Works, and **Henry N. Schumacher** has been named to succeed Mr. Holmberg. Mr. Holmberg joined Inland in 1927, and Mr. Schumacher in 1934.

—o—

Howard R. Swartz has been appointed general sales manager, **Cleveland Cap Screw Co.**, Cleveland. He has been transferred from Lansing, Mich., where he represented the Cleveland company for a number of years as a member of **M. C. Snyder Co.**, manufacturer's agents.

—o—

Gulf Oil Corp., Pittsburgh, has named



D. P. CLARK

the following men to newly created managerial positions in its reorganized program of domestic sales: **D. P. Clark** has been named general manager, direct marketing, in charge of the primarily direct-to-consumer commercial, contractor, industrial fleet and transportation markets. **W. R. Huber** was appointed general manager, retail marketing; **W. E. Dermody**, advertising manager; **C. E. Skinner**, commercial research manager; and **G. T. Ryan**, operations manager.

—o—

Standard Pressed Steel Co., Jenkintown, Pa., has appointed **George A. Gade** regional sales manager in charge of midwest territories with headquarters in Detroit. **Francis J. Kinsella** succeeds Mr. Gade as district manager of the firm's Detroit office and warehouse. **David J. Hurford**, Cincinnati district manager, has been named special representative for air-

craft products on the West Coast. **William C. Harper** has been selected for the Cincinnati post. **A. Clayton Graham** replaces Mr. Harper as sales representative in the New England territory.

—o—

Dr. Joseph A. Orsino, **George Vahrenkamp**, **Dr. Charles H. Moore** and **Edwin P. Peterson** have been transferred to the New York office of **National Lead Co.** to act as assistants to **Alex Stewart**, director of research. They will integrate and co-ordinate research and development for the company's laboratories. Dr. Moore has been a department supervisor in the Titanium Division laboratories, Seaside, N. J.; Dr. Orsino has been in charge of storage battery research at the Brooklyn, N. Y., laboratories. Mr. Peterson has been in charge of paint and pigment research and development, Brooklyn, and Mr. Vahrenkamp has been engaged in metallurgical and smelting research at Brooklyn laboratories.

—o—

Samuel F. Dubs has been appointed chief metallurgist for **Morris P. Kirsch & Son Inc.**, subsidiary, **National Lead Co.**, New York. **W. A. Senter** was named acting superintendent of Kirsch's Los Angeles plant.

—o—

Charles W. T. Stuart, president of **Safety Car Heating & Lighting Co. Inc.**, New York, has been elected to the board of directors of **American Arch Co. of Delaware** and **American Arch Co. Inc.**, New York.

—o—

Richard H. Diesel has been appointed production manager of the Stamfo-



RICHARD H. DIESEL

Division, **Yale & Towne Mfg. Co.**, New York. He succeeds **Frank C. Prue** who will retire in November after 42 years with Yale & Towne. Mr. Diesel has been associated with the company since 1939 and prior to

SLAT HAPPY!



No tugging! No warping!

**NO WONDER everyone wants this new kind of slats
in venetian blinds! Because ALUMINUM LASTS**

As though it weren't enough to give you *lightweight* venetian blinds, clever manufacturers who use Alcoa Aluminum also give you blinds that stay new-looking!

Here's how it happened:

Starting with pure aluminum, we spent years alloying it with small amounts of other metals. Found ways to roll the strong alloy into strips—wafer-thin, feather-light, but

strong as steel. Showed manufacturers of venetian blinds how to finish them in natural aluminum or colorful paint.

That kind of development takes time. But it enables us to say "Alcoa Aluminum lasts!" and back it up, in thousands of products that mean better living for you. ALUMINUM COMPANY OF AMERICA, 2115K Gulf Bldg., Pittsburgh 19, Pa. Sales offices in principal cities.

ALCOA

**FIRST IN ALUMINUM
THE METAL THAT LASTS**



latest appointment was director of systems and procedures. **Frank S. Haniewich** who joined the firm in May of this year as systems engineer after 12 years with Weatherhead Co. has been named assistant production manager.

—o—

John R. Cary has been appointed sales manager, **Browning Crane & Shovel Co.**, Cleveland, succeeding **William H. Waite** who has retired following long service with the company.

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Raymond A. Cole has resigned as vice president, **Pope Machinery Corp.**, Haverhill, Mass.

—o—

F. Donald Hart, executive vice president, **Tennessee Enamel Mfg. Co.**, Nashville, Tenn., has been elected chairman of the marketing committee of the **Gas Appliance Manufacturers Association**. **D. R. Meckstroth**, associate director of sales research, **Servel Inc.**, Evansville, Ind., has been designated vice chairman.

—o—

Election of officers at **Affiliated Furnace & Engineering Inc.** was erroneously reported in STEEL, Oct. 3 issue, as being at **Chemsteel Construction Co. Inc.**, Pittsburgh. Affiliated Furnace & Engineering is a new associated company created by Chemsteel to specialize in design, construction and maintenance of industrial furnaces. The new company's officers are: **Arthur M. Krieger**, president and general manager; **Clarence B. Avery**, vice president-engineering; **Merrill A. Stewart**, vice president-construction; and **Charles E. Stone**, secretary-treasurer.

—o—

Dr. Martin M. Freundlich has joined **Airborne Instruments Laboratory**, Mineola, N. Y., where he will be in charge of the newly established tube laboratory in the applied physics section directed by **Rodney F. Simons**. Dr. Freundlich has been closely identified with television research at Columbia Broadcasting System.

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P. M. Offill Jr. will represent **George P. Reintjes Co.**, Kansas City, Mo., in the sale of suspended arches and walls in the Pittsburgh area. He formerly represented the company in California.

—o—

Whitney E. McDowell has been appointed to the sales staff of **Barney I. Florey Co.**, Cleveland, representative for **Automatic Transportation Co.**, Chicago. Before joining Florey Mr. McDowell worked for **American Steel & Wire Co.**, and later as a field

engineer for **Edison Storage Battery Division**, **Thomas A. Edison Inc.**, in the Cleveland area.

—o—

W. L. Veit has been appointed specialist on **Crescent** woodworking machinery to the **Power Tool Division**, **Rockwell Mfg. Co.**, Milwaukee. Mr. Veit served as sales manager of **Crescent Machine Co.** and held the post after **Crescent** became a division of **Rockwell**. **Power Tool Division** combines the sales organizations of **Delta**, **Crescent** and **Red Star Products** into a single sales organization.

—o—

M. Adolph Heikkila, until recently with **New Jersey Zinc Co.**, has formed his own public relations consulting service at 35-15 91st St., Jackson Heights, L. I., N. Y.

—o—

Edward W. Bowman has been appointed engineer, **Arch & Wall Sales Division**, **Laclede-Christy Co.**, St. Louis. He will make his headquarters in Pittsburgh. Mr. Bowman spent a number of years in industrial furnace design and construction.

—o—

Ernest H. Pauli has been appointed an industrial distributor for **Atlas Chain & Mfg. Co.**, to serve northern New Jersey, New York and western Connecticut. Mr. Pauli, who has offices in Manhattan and Newark, has gained experience in the power transmission field through the representation of such products for many years.

—o—

C. K. Banks has been named direc-



C. K. BANKS

Carl E. Berndt has been appointed manager of warehouse products for **Timken Roller Bearing Co.**, Canton. **O. Anthony J. Lombardi** has been appointed warehouse supervisor, succeeding Mr. Berndt.

—o—

Charles E. Stevens Jr. has joined **Chicago Railway Equipment Co.**, Chicago, as plant manager. Since 1941 he has been with **Fairchild Engine & Airplane Corp.**, most recently as chief engineer of the Al-Fin division. In addition to his other duties, Mr. Stevens will direct the development work on the Al-Fin bimetallic aluminum bonded to iron brake drums, pistons and other bimetallic products for **Chicago Railway Equipment Co.** and its subsidiaries.

—o—

Robert Trefcer has been appointed western sales manager, **Sargent & Co.**, with office in San Francisco.

—o—

E. Victory Spielberg has been elected president of the newly organized **Steel Improvement Co. Ltd. of Canada**. Other officers are **Louis H. Elsie** and **Bruce H. Mowat**, both of **Atlas Engineering & Machine Co. Ltd.**

—o—

Russell C. Clark, vice president, **Ti Sales Corp.**, agent for **Reconstruction Finance Corp.**, since formation of the company in 1943, has resigned to join **Nathan Trotter & Co.**, metal merchants of Philadelphia. Mr. Clark will open a New York office at 2 State St. where a brokerage business in metals, particularly pig tin, will be conducted.

—o—

W. J. Scott, manager of manufac-



W. J. SCOTT

tor of research, **Metal & Thermit Corp.**, New York. He had previously headed the chemotherapy division of **Parke, Davis & Co.** research laboratories in Detroit. His new headquarters will be the company's Research Laboratory at Woodbridge, N. J.

turing plants, **Chevrolet Motor Division**, **General Motors Corp.**, Detroit, has been appointed general manufacturing manager. He has been with Chevrolet for 34 years. In his new position he succeeds **Hugh Dear** who has been appointed GM vic-

resident in charge of the manufacturing staff. **E. S. Wellock**, manager of assembly plants, succeeds Mr. Scott as manager of manufacturing plants. **R. G. Ford**, general purchasing agent for the division, succeeds Mr. Wellock as manager of assembly plants.

—o—

Frederick A. Mattfield has been appointed factory manager of the Elmsira, N. Y., plant, Eclipse Machine Division, **Bendix Aviation Corp.** He succeeds **S. B. Kurzina** who has accepted a position with **Curtiss-Wright Corp.** in Woodridge, N. J. Mr. Mattfield has been with Eclipse since 1941 and prior to his latest appointment served as general superintendent.

—o—

Angus G. Scott, formerly assistant resident representative for **Westinghouse Electric International Co.** at the Westinghouse East Pittsburgh plant, works has been named resident representative. He succeeds **Ernest**



A. S. GLOSSBRENNER

Assistant vice president of operations, **Youngstown Sheet & Tube Co.**, Youngstown, elected president, **Association of Iron & Steel Engineers**. Noted in **STEEL**, Oct. 10 issue, p. 91

P. Schroeder, resident representative since 1936, who is retiring. Mr. Scott has been with Westinghouse since 1937 and held a number of sales posts

OBITUARIES...

Douglas B. Hobbs, 49, in charge of motion pictures, educational and technical information activities, public relations and advertising department, **Aluminum Co. of America**, Pittsburgh, died Oct. 11 in New York of a heart attack. He was attending a convention of the Association of National Advertisers. Mr. Hobbs joined the company in 1923 as a research metallurgist in the Cleveland branch of Aluminum Research Laboratories. He joined the public relations department in Pittsburgh in 1929, and during his 20 years in that department wrote numerous technical and general articles on aluminum for various magazines, and also authored two books.

—o—

Joshua L. Miner, 67, retired vice president of the Lummite Division, **Universal Atlas Cement Co.**, New York, died Oct. 7 in Plainfield, N. J. He joined the cement company in 1922, and in 1924 became identified with a subsidiary, **Atlas Lummite Cement Co.**, as manager of sales, production and research. In 1937 he was elected director and vice president of that subsidiary, which became the Lummite Division of **Universal Atlas Cement Co.**, from which he retired in October, 1947.

—o—

Frank R. Bacon, 77, chairman of the board of **Cutler-Hammer Inc.**, Milwaukee, died Oct. 6. He organized the Cutler-Hammer concern as a

Wisconsin corporation, which absorbed both the American Rheostat and Cutler-Hammer Co. of Illinois.

—o—

Noel Urquhart, 42, a staff engineer in the Victor Division, **Radio Corp. of America**, at Camden, N. J., died Oct. 8. Before joining R.C.A. in 1948 he was vice president of the Control Instrument Co., Brooklyn, N. Y., and a technical director of Heyer Industries Inc., Belleville, N. J.

—o—

Frank Schartow, 67, Racine, Wis., industrialist for 40 years, died Oct. 2. He purchased the Barton Co., Racine, in 1911, and changed its name to **Schartow Mfg. Co.** and transferred its operations to South Milwaukee. In 1921 he started **Schartow Iron Products Co.** in Racine. He retired in 1948.

—o—

George D. Keller, 56, president, **Keller Motor Corp.**, Huntsville, Ala., died in New York Oct. 5 while on a business trip. Mr. Keller had been associated with **Studebaker Corp.** for many years, serving as sales manager before he was elected in 1935 as vice president in charge of sales.

—o—

John D. Halen, 60, president and treasurer, **General Tool & Die Co.**, Cleveland, died Oct. 9 following a heart attack.

—o—

George R. York, 37, of Park Ridge, Ill., salesman for **Bullard Co.**, Bridgeport, Conn., died Sept. 25. He became associated with Bullard in 1937

with manufacturing divisions prior to being named assistant resident representative last year.

—o—

J. N. Jones, formerly electrical service supervisor for **Westinghouse Electric Corp.** in Los Angeles, has been named electrical superintendent of the company's Pacific Coast district. His headquarters will be in San Francisco.

—o—

T. A. White has been named head of the new Pacific Coast sales region created by **Pontiac Motor Division**, General Motors Corp. He will supervise sales in the San Francisco, Portland, Oreg., and Los Angeles zones. **Don R. Stuart** will succeed him as San Francisco zone manager. **A. L. Drury** has been appointed parts sales manager for the division at Pontiac, Mich. He succeeds **L. W. Walker** who has been named sales promotion manager.

as a boring mill operator and shortly after was promoted to demonstrator. In 1942 Mr. York was transferred to the Chicago office as sales engineer.

—o—

Edward R. Fitzgerald, 49, assistant engineer of the refrigeration unit, **Erie Works**, **General Electric Co.**, Erie, Pa., died Oct. 5 after a two-week illness.

—o—

C. Howard Henderson, 53, a former executive of **Curtiss-Wright Corp.** in Buffalo, died Oct. 7 following a heart attack. He was administrative executive in quality control at the aircraft firm in Buffalo for 21 years.

—o—

Walter J. Frost, 83, founder of **Frost Co.**, Kenosha, Wis., in 1902, died Oct. 3. He was president and treasurer of the metal parts firm for 35 years, and chairman of the board of directors when he died.

—o—

Edward W. Londegran, 66, secretary, **Lovell Mfg. Co.**, Erie, Pa., died Oct. 7. He had been associated with the firm for 50 years.

—o—

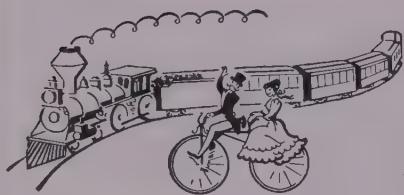
Harvey M. Smith, 61, president, **Smith-Lee Bottle Cap Co.**, Oneida, N. Y., died Oct. 6. He was a former executive of **L. C. Smith & Corona Typewriters Inc.**, Syracuse, N. Y.

—o—

Lawrence J. Parrish, 56, New York industrialist and former director of industrial relations for **A. O. Smith Corp.**, Milwaukee, died Oct. 2.



80th Birthday of the oldest name in chain



Since 1869... Security in every link

IN 1869 the driving of a golden spike united the Union Pacific and Central Pacific Railroads... joined our eastern and western coasts.

In the same year Thomas Edison announced the opening of his electrical laboratory. The Indian Wars officially ended. Popular songs were "The Little Brown Jug," "Shoo Fly, Don't Bother Me," and "Up in a Balloon."

And—in 1869 David Round founded the chain-making organization which today operates factories in six U. S. cities... whose products are used in homes and industry throughout the world.

David Round learned his trade as an apprentice in his father's hand forged chain plant in Staffordshire, England. A master chain craftsman, he demanded the utmost in fine workmanship... refused to compromise with quality.

This insistence upon perfection continues today.

It is the guiding spirit of the organization which is now headed by Raymond L. Round (chairman of the board and president), a grandson of the founder.

Members of the supervisory group in the Cleveland factory (foremen and superintendents) average 26 years of service. Six have exceeded 40 years. Many families claim three generations in Round plants.

And, working side by side with veteran craftsmen, are large groups of carefully selected younger men. They are being trained to maintain the Round standards of quality...will provide business leadership in years to come.

To the Round organization, the production of fine chain is more than a business. It is a tradition to be upheld... a reputation to be carefully guarded. And, above all, it is a clearly recognized responsibility which guarantees that every Round Chain product will be unsurpassed in quality.



CLEVELAND CHAIN

The Cleveland Chain & Mfg. Co.

Cleveland 5, Ohio



Industrial Sling Chains • Farm Chains • Marine Chains • Tire Chains • Log Chains • Building Chains • Railroad Chains • Crane and Dredge Chains • Sugar Cane Sling Chains (with Grip Tri

Round Associate Chain Companies: The Bridgeport Chain & Mfg. Co., Bridgeport, Conn. • David Round & Son, Cleveland, Ohio • Round California Chain Co., So. San Francisco and Los Angeles, Cal. • Seattle Chain & Mfg. Co., Seattle, Wash. • Woodhouse Chain Works, Trenton, N. J.

PRACTICAL WRINKLE—In sharpening face milling cutters, the operator must hold the cutter against the tooth rest finger the cutter grinder with his hand while traversing the grinding wheel across the cutter blade. A tool grinding foreman one plant, Norton Co., Worcester, Mass., reports, found difficult to hold very small cutters with his hand. With little experimenting, he discovered that by simply attaching a disk or solid handwheel to the same spindle on which the cutter is mounted, he could manipulate the cutter with same even greater facility—without slightest discomfort or danger to his hand.

BETTER ARC RESISTANCE—Arrow-Hart & Hegeman Electric Co., Hartford, Conn., currently is employing a new type resin compound in molding bases and protective hoods for its latest line of magnetic starters. Besides exceeding arc resistance of the next best material by 50 to 60 per cent, the compound does not support combustion, resists abrasion and provides superior dimensional stability. Company engineers believe the Libbey-Owens-Ford Glass Co. - developed product will enable the equipment to be used in many locations formerly considered detrimental to the operation of normally-protected devices.

GIANT MAGNETIC PULLEY—Large magnetic pulley shipped to Pennsylvania Glass Sand Corp., Hancock, W. Va., from Milwaukee by Dings Magnetic Separator Co., includes 600 pounds of Alnico—largest amount of the alloy ever used by the company in a single piece of equipment. To be employed in removing iron impurities from sand used to make glass, the 2200-pound pulley is 24 inches in diameter, 60 inches wide. The aluminum-nickel-cobalt iron alloy casting is magnetized by heavy currents of short durations reaching peaks in the vicinity of 100,000 amperes.

CAST REPLACEMENT—Replacement method worked out by Texas Engineering & Mfg. Co. Inc., Dallas, in supplying new parts for damaged aircraft eliminates necessity of stocking hundreds of expensive parts. Typical of how the tooling department of the company functions in making replacements is the case of an airplane which arrived with a cracked and corroded stabilizer rib. The old rib was sent to tooling where it was used as a mock-up from which a master pattern was made. Latter then was sent to the foundry for the necessary work required to make a die which was then routed to the hydro-press section where an identical part was formed. Total time for the process was less than 2 days.

ROADENS COATING APPLICATION—Successful method of flame-spraying polythene on metal surfaces, developed by the Engineering Research lab of E. I. Du Pont de Nemours & Co., Wilmington, Del., is accomplished by a spray gun in which the flame is obtained by mixing fuel gas and air beyond the torch nozzle, rather than by premixing them. Jams 8 to 12 inches long are used and gun is held so surface being covered is about 2 inches from the flame tip. The method enables about 16 square feet of surface to be covered in 1 hour. Tests indicate adhesion of the corrosion resistant material is good, and that temperatures used do not degrade the polythene.

COMPLICATING FACTOR—When determining size of slitter units most suitable for a given plant, it is important to take into account the relation between actual tonnage requirements of the setup, potential slitter production as well as size and weight of coils, thickness of stock and number of cuts to be made to the width. In other words, it is necessary to distinguish between slitter capacity in terms of tonnage it will slit per hour, its capacity in terms of coil weights and stock dimensions that it will handle. The former, it is pointed out, is generally referred to as potential output or production and the latter generally as capacity. Choice is complicated by the fact potential output from any given size of slitter unfortunately is not a fixed quantity. (p. 77)

FINISHING TECHNIQUE DIFFERS—Processing stainless steel into consumer products presents varied finishing problems in which coated abrasives play an important part. Difficulties center principally around need for employing mechanical means for blending-in satin finish on surface areas, marred by spot welding, machining, forming and handling. Methods employed to achieve uniform satiny luster differ from those for most other ferrous and nonferrous alloys—no need for plating or painting. However, they do involve the use of abrasive belts coated with the proper grit and lubricant. (p. 81)

BILLET HEATING—Heating of rounds prior to piercing operations in the manufacture of seamless tubes is one of the most important steps in the procedure. Heating mediums tried to provide the billet with a uniform temperature across its cross section posed problems which finally were overcome only in recent years. The rotary hearth type furnace, which allows radiant exposure of each billet either directly or by reflection from the hearth, was a great step forward. The latest medium to be developed consists of a straight-line series of barrels equipped with radiant burners. Materials in this tunnel-like structure are carried on rolls which are slightly skewed to cause the billets to turn slowly as they proceed in "soaking up" the heat. Radiant heat input is extremely high, shortening time of exposure and minimizing scale loss. (p. 86)

IMPROVED



INDUCTION HEATING

Cuts Processing Costs

As a result of significant advancements in equipment design, more effective use of high frequency induction heating methods is being made on such jobs as through heating for forging, annealing for forming and drawing operations, selective hardening

By HERMAN C. DUSTMAN
Chief Engineer
High Frequency Division
Lindberg Engineering Co.
Chicago

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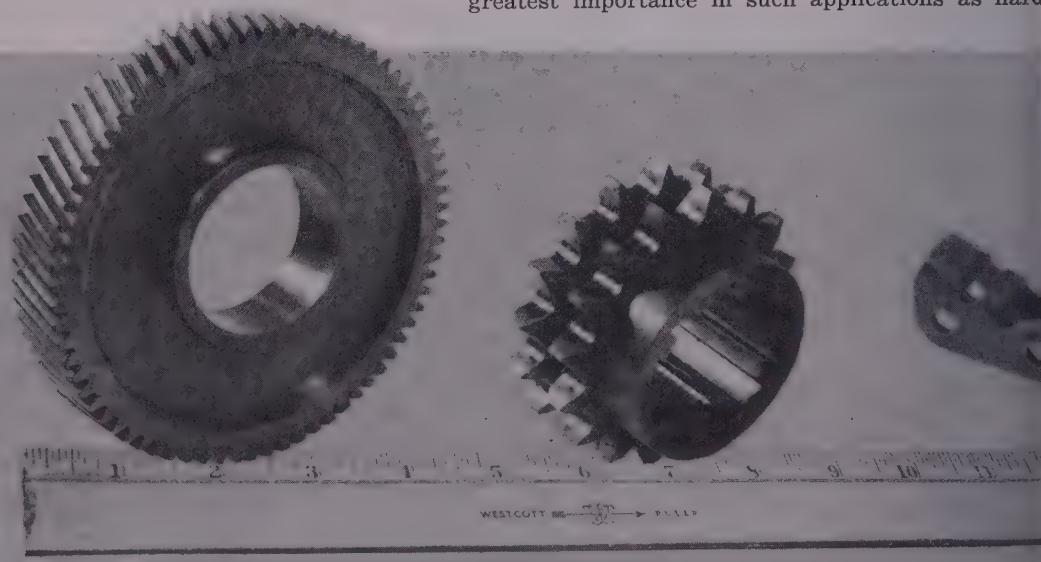
POSTWAR industry is showing continued and increasing acceptance of induction heating equipment to the point where it is supplementing conventional furnace equipment and replacing other methods applying heat to various manufacturing operations. While the process has its limitations, nevertheless the savings and economy of this method were proved many times over during the last war where it solved many a production bottleneck. Hence, it is only natural that high frequency induction heating should become a significant means for reducing manufacturing costs in today's competitive market.

Advantages — Obviously, in order to justify the higher initial cost of induction heating equipment over conventional equipment it must in the end produce better, cheaper or more acceptable jobs. Since many such proved applications exist, induction heating can lay claim to the following advantages:

1. It permits both rapid and accurate control of applied heat.
2. Heat can be applied exactly to the area desired.
3. Amount of heat or power concentration per unit area is many times greater than otherwise be obtained.
4. Instant availability (warm-up time required).
5. Simplicity of control (Unskilled employees can operate the equipment).
6. Flexibility of application.
7. A clean job (scaling and oxidation greatly reduced).
8. Reduction in warpage.
9. Greatly reduced heating time and cost.

Such jobs as through heating for forging, or annealing for forming and drawing operations are only a few of the many applications that can be cited. Other examples are: High temperature brazing; soft soldering; melting small amounts of ferrous and nonferrous and precious metals; melting electrolytically deposited tin for tin reflow; heating for shriveling; selective hardening, etc. Several actual examples are shown in Fig. 1.

Selective hardening or case hardening are of course the main fields of application for induction heating equipment. Here a phenomena peculiar to high frequency currents commonly called "skin effect", in conjunction with high power concentrations is utilized to produce a thin case-hardened surface. Therefore, since the core of the piece being heated remains unaffected it retains its full toughness and hence full mechanical strength. These factors are of greatest importance in such applications as hard



g of crankshafts, camshafts, wrist-pins, etc., where both wearability and strength are desired.

Basic Theory—The phenomena of heating both ferrous and nonferrous metals by placing them in an alternating magnetic field have been understood for a long time. In fact, the basic laws and formulas were expounded by Steinmetz, Thompson and others in the early days of electricity. To them, the heat produced as for example, in a transformer core, represented a loss or power waste. However, in induction heating as used today, the object is to produce heat in the work piece which is actually the core of a transformer, the windings being the work coil or inductor. The heat is then produced by the eddy currents induced in the work according to the basic laws of electromagnetic induction.

At the higher frequencies the phenomenon of skin effect adds further to the heating by virtue of the fact that the induced currents flow only through the thin surface layer or "skin" of the conductor. It can be shown that the induced current and hence the depth of instantaneous heat penetration can be expressed as:

$$D = \frac{3550}{2.54} \sqrt{\frac{\rho}{\mu f}} \quad \text{inches.}$$

ρ = resistivity ohms per cm. cube

μ = magnetic permeability

f = frequency in cycles

Fig. 2 this formula is plotted for various metals and over a wide frequency range.

Basic Types—Three basic types of high frequency induction heating equipment are on the market today. These are:

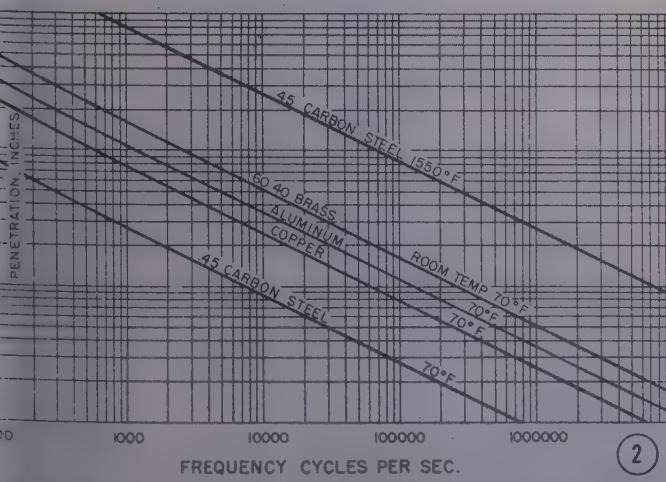
1. Motor generator sets operating up to 9600 cycles per second.
2. Spark gap sets operating from 200,000 to 400,000 cycles per second.
3. Vacuum tube oscillator generating a frequency of 450,000 cycles per second.

All are capable of performing the various heat

Fig. 1—Typical work heat treated on a 25 kw induction unit

Fig. 2—Depth of penetration vs. frequency

Fig. 3—Curve showing relation between filament life and applied voltage

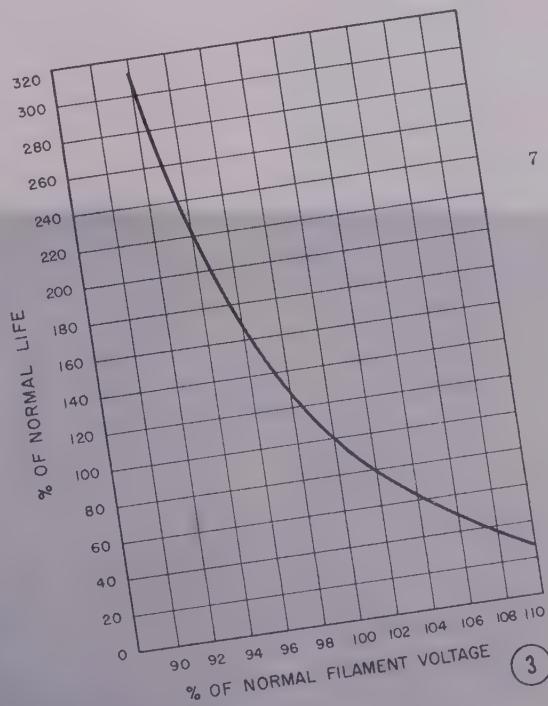


treating jobs previously outlined. There is no definite demarcation line in their usefulness. However, in general, due to the deeper penetration of the low frequency currents, motor generator sets find their greatest application where deep-heating or through-heating is permissible. Spark gap equipment and vacuum tube type generators on the other hand both produce higher frequency currents and hence are used where thinner case depths are desirable.

Historically, all three types of equipment had their commercial inception in the early 1920's when the spark gap was the generally accepted means of producing high frequency energy for radio communications. Large water or air-cooled power tubes such as are used in present day induction heating equipment were at an early stage of development and extremely costly. It was not until about 10 years ago that the handicaps of high tube cost and component cost were reduced sufficiently to make the vacuum tube generator commercially practical.

Vacuum Tube Improvements—Since that time the vacuum tube type machine has won increasing acceptance over its older competitor, primarily because the spark gap machine is limited in its power output capabilities and requires a great amount of maintenance. Through the intervening years many improvements have been incorporated in vacuum tube induction heating equipment. Since basically an induction heating unit is a radio transmitter, the design of early equipment was dictated by radio and communications practice. It was soon learned by experience that equipment designed for industrial use required an entirely different perspective.

Equipment instead of being carefully adjusted and under constant surveillance by a trained technician or engineer was more apt to be misadjusted and subjected to abuse from untrained and unskilled personnel. Furthermore, simplicity of operation and reliability with a minimum of maintenance, while never ignored in radio transmitter design became an absolute "must"



in induction heating equipment. The induction heating equipment designer has taken these and other factors into account to produce equipment that is reliable, trouble free and as rugged as any machine tool found in industry today.

New Design Features—A few electrical and mechanical features of a new design, the simplified schematic diagram of which is shown in Fig. 6, are discussed here. In general, the circuit is quite conventional and consists of the familiar three-phase full-wave high-voltage rectifier for converting line voltage to direct current, a vacuum tube oscillator connected as a tuned-plate circuit, and various control and protective relays.

Water or air-cooled transmitting tube producing the high frequency energy is the heart of any induction heating unit, and in this design a thorough comparison was made of the advantages and disadvantages of various types. Until recently the equipment designer had little choice in the selection of available tubes and as a result was forced to use existing types employed in radio communications work. However, several progressive tube manufacturers became interested in the problem and have designed specific types to withstand the rigors of industrial use.

Such tubes feature the strengthening of the internal tube structure, the use of Kovar seals instead of the commonly employed feather-edge seals, a heavy-walled anode structure and other improvements tending to produce longer tube life. Fig. 7 shows such a tube and its radio counterpart.

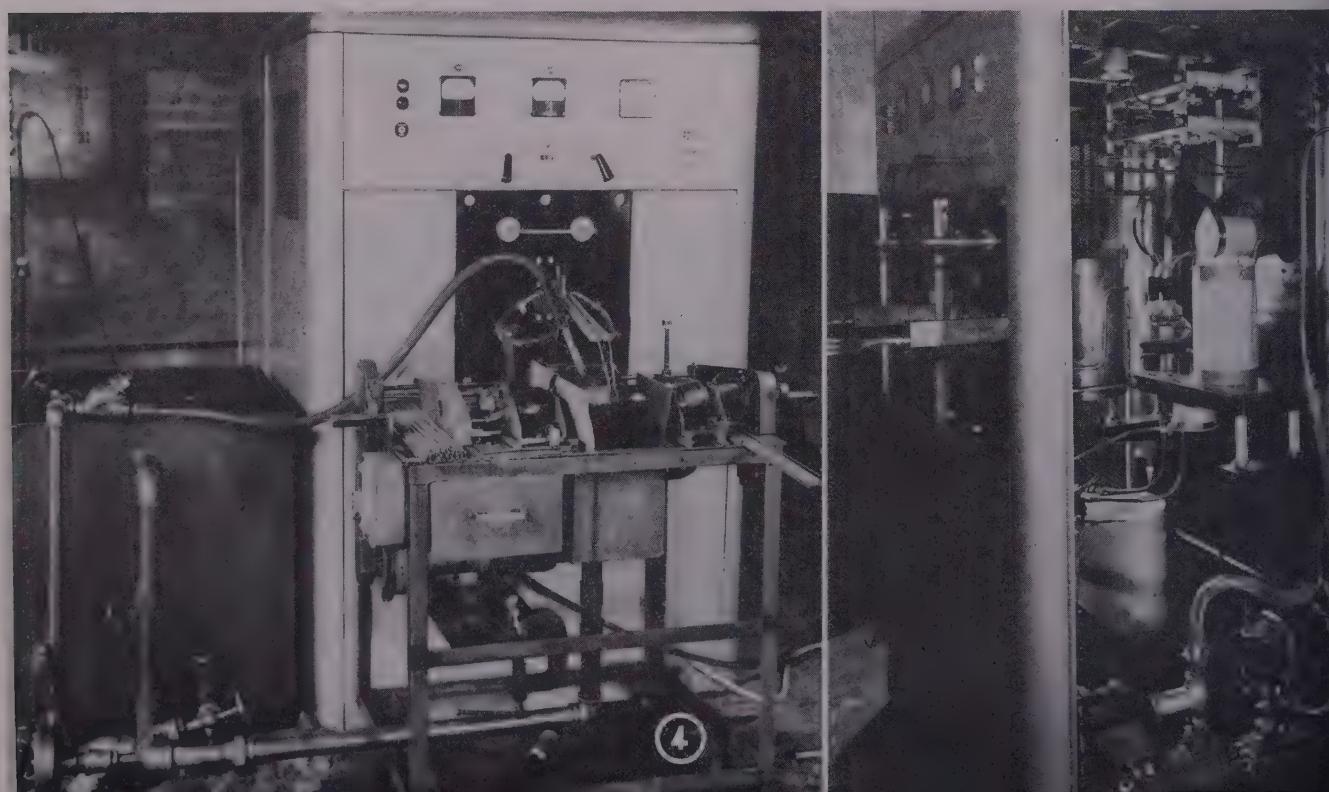
Constant Voltage Filament Supply—In order to protect the oscillator tube adequately and to insure maximum useful life, the associated equipment was carefully selected. Two conditions that can induce early tube failure and which are directly dependent upon auxiliary equipment are: 1. Improper filament voltage. 2. Inadequate cooling.

It is common knowledge that overvoltage on a lamp bulb as well as a transmitting tube will result in a shortened life. It can be seen from the curve Fig. 3, that an overvoltage of 10 per cent results in a life expectancy of 25 per cent of normal. Experience has shown that many commercial power lines often have a fluctuation equal to or greater than this, hence, a constant-voltage source for filament supply was incorporated in the early planning of the design.

Closed Water System—Both air and water have been successfully employed in the past as a cooling means in induction heating units. In general, water cooling is preferable for the larger units, since for any particular tube type the plate dissipation rating (which means the ability to withstand heavy overloads) is twice that of its air-cooled counterpart. Also, since the units are usually installed in locations where the air is contaminated, the high volume of clean filtered air required by the larger units represents quite a maintenance cost.

However, the use of water cooling in itself is not the simple answer to this problem, since it also has its drawbacks and limitations, as follows: 1. Hard water containing iron and other minerals cannot be used because of the formation of calcium on the anode which prevents proper cooling. 2. Hard water or water of low resistivity aggravates electrolytic and erosion of pipe fittings, water jackets, etc., results. 3. In localities where water costs are high, water consumption of from 6 to 15 gallons per minute can represent quite an operating expense. 4. Water pressure and volume at the site of installation are often inadequate or vary between wide limits.

These disadvantages would seem to present a formidable argument against the use of water cooling. Previously these difficulties were overcome by the addition of an external closed water or recirculating system, entailing additional expense, and requiring external piping and electrical connections. Ho-



er, in the unit described, these problems were eliminated by the use of an integral closed water system, carefully engineered to obtain the following results: 1. Permit the use of distilled or rain water in hard water localities, thereby eliminating calcium deposit and electrolysis. 2. Eliminate "sweating" or condensation in humid locations. 3. Reduce raw water consumption and hence operating cost. 4. Eliminate the effect of raw water pressure and volume variations by use of a temperature-controlled valve to average out the fluctuations.

Two-Position Machine—The prospective purchaser of any induction heating equipment is primarily interested in obtaining a unit that will do the job on demand. Frequently following the original installation and set up, the unit is used for other jobs, and in doing them successfully is soon loaded beyond its capacity with various and sundry work. The question then is, how to get a greater quantity of work through the machine in a given time.

Invariably, considerable time is lost in loading and unloading or in preparation of the work prior to heating. Such handling operations can occur simultaneously with heating in a two-position machine, thereby greatly increasing the output capacity. This thought was kept in mind in the design of the present unit. Fig. 5 shows the appearance of such a dual position machine.

It is of interest to note that the changeover from a single to a two-position machine can be made in the field without undue complications. Therefore, increased capacity is readily obtainable at any time if desired. The upper busses accommodate multi-turn work coils, and the lower, heavy single-turn bus-bar coils. Absence of unsightly hose lines, conductors, etc., is another feature.

Theoretically, there is a "best" or optimum turns ratio for every job, and on this basis a number of output transformers would be required. Experience

however, has shown that this "ideal" condition is not necessary in actual practice. The single output transformer arrangement, as incorporated in this design, will operate satisfactorily on practically all jobs within the output capability of the machine.

Other Features—In addition, there are many other new features incorporated in the unit described on the preceding pages. One of these that should, in conclusion, bear special attention is the Checklite system for revealing any abnormal conditions at the protective and control devices. It has already proved itself useful in service and maintenance work with personnel unfamiliar with the entire functioning of the unit. Operation of the scheme can be readily understood by referring to the schematic diagram, Fig. 6.

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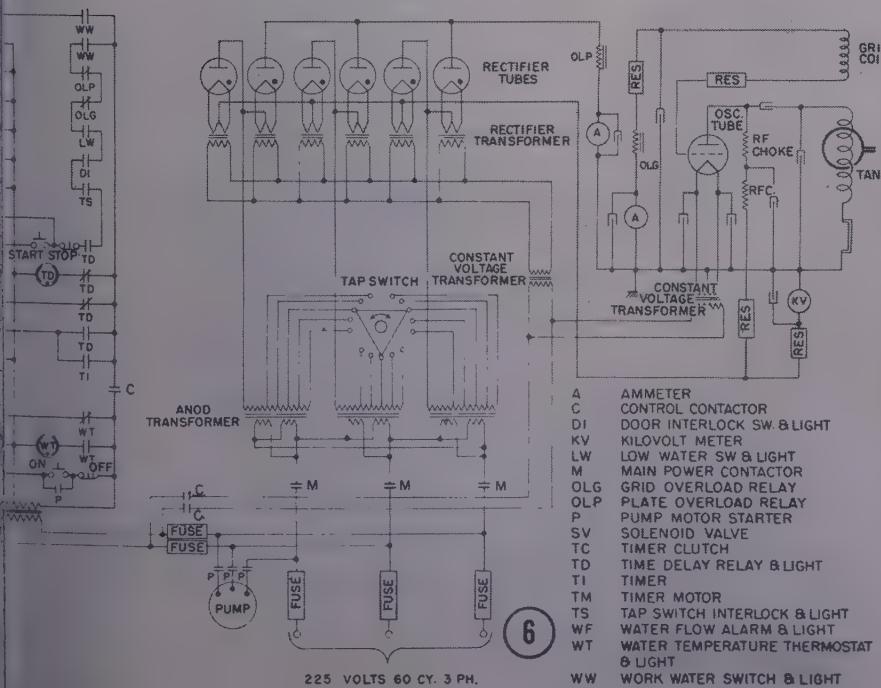
1. F. W. Curtis, *High Frequency Induction Heating*
2. W. I. Bendz, *Electronics for Industry*
3. G. H. Brown, C. N. Hoyler, R. A. Bierwirth, *Theory and Application of Radio Frequency Heating*
4. N. R. Stansel, *Induction Heating*

Fig. 4 — Actual 25 kw installation in a commercial heat treating shop. Fixture shown progressively hardens rods

Fig. 5 — Two-position, 25 kw unit, showing interior and closed water system

Fig. 6 — Simplified schematic circuit of a 25 kw induction heating unit

Fig. 7 — Industrial tube, left, and its radio counterpart, right



SEEN AND HEARD IN THE

Machinery Field

By GUY HUBBARD
Machine Tool Editor

THROUGH THE CAMERA'S EYE: On a number of occasions lately, I have been impressed by the effectiveness of the photographic lens as a help to human eyes in seeing into difficult and even dangerous places in the study of industrial processes and moving machinery. This point is driven home by many of the excellent movie films being exhibited at the "Economy Theaters" at the National Metal Congress and Exposition at Cleveland this week.

"Why", one may ask, "should I study processes and machines through the eye of a camera, when I have an opportunity to study them at first hand through my own eyes?" There are several good answers to that question—the most convincing one being that the inanimate eye of the camera can "bore into" areas of activity where heat, sparks, fumes, flying chips, spray of coolant and even dangerous radiation make the climate both dangerous and uncomfortable for direct seeing. Not only can the eye of the camera bore into such places, but also it can "see" for a large group what only an individual could see if he chose to risk his eyesight through direct viewing.

In addition to safe closeups, the camera can be made to do many useful tricks such as magnifying small areas of activity—action at the edge of a cutting tool for example; slowing down rapid action—such as flow of metal under a hammer; and behavior of machinery details under stress—by plastic models operating under polarized light.

There was a time when industrial moving pictures were just another and mildly serious form of entertainment. Eventually they became educational. Today they have entered a phase where they rank with computations as practical aids in the design and application of the latest methods and equipment for metal processing. They will help you to "unlearn" unsound theories and to replace them by sound theories which readily can be translated into practice.

COMMON SENSE ASSEMBLY: As a guest of the K. R. Wilson organization, whose main office is in Buffalo and whose manufacturing plant is in Arcade, N. Y., about 40 miles southeast of Buffalo, I have just had a convincing demonstration of what common sense and the good old garden variety of mechanical ingenuity can accomplish in taking the backaches and headaches out of the putting-together and the taking-apart of mechanisms.

The whole thing started nearly 40 years ago when

the late K. R. Wilson and his brother F. C. Wilson who as general manager was my able guide through the Arcade plant—developed special holding devices and special tools for servicing Model T Ford engines and other details in their automobile repair shop. After demonstrating the efficiency of their machines and tools and methods to local people, K. R. Wilson got Henry Ford interested in the proposition—which resulted in the two brothers found themselves engaged in big business as manufacturers of automotive service shop equipment for the trade.

Looking at the Wilson achievements with the eyes of a machine tool man rather than those of an automobile man, I have been impressed by two things. One is the amount of useful machine per dollar which they have achieved through simplification of design and through flame cutting and welding. The other is the wide possibilities which several of their devices and machines hold for manufacturers of machines in small and medium lots—machine tool builders for instance.

Some of the caster-equipped "roll-over" work stands which F. C. Wilson demonstrated to me in connection with engines and transmissions, would be ideal for holding headstocks, gear boxes, slides and other subassemblies "in process". Special support brackets are all that would be required to adapt them to such use.

F. C. Wilson also is a genius in simple adaptation of hydraulic power to simplified arbor presses, cold and hot forging and forming presses, press brakes, and last but by no means least—to a combination push-pull machine for broaching holes. This Wilson broaching machine is deserving of a separate story. Of that more later.

IMPORTANCE OF FOUNDATIONS: If machine tool users could spend more time in plants where the machines are built, they never would stoop to the carpenter's levels and shingles when setting machines on their operating floors.

The average user doesn't appreciate the attention which the builder devotes to "alignment". It starts in the drafting room with design of beds, frames and slides. It carries through the pattern shop, where patterns and core boxes are designed with alignment in mind. Molders, coremakers, core setters and foundrymen devote their experienced attention to

Between foundry (or weldery) and shop, stress relieving by aging or by heat treatment further insures alignment. In some cases aging or heat treatment follows "skin cuts". In the shop the work is supported so that no humps or permanent sets can take place, and planing and grinding is done with infinite care. Next comes the tedious operation of scraping into which goes skill equal to that devoted to making surface plates and parallels. Finally comes the painstaking assembly and "lining up" of details.

The builder knows how the machine ought to be set up. He provides instructions and working drawings for foundations. In some cases he even provides precision levels. However, he can't force you to right by his machine after it becomes your property. That is strictly up to you.

ROTARY GANG SLITTING

An Effective Production Tool

Importance of distinguishing between tonnage production requirements of a given plant and capacities of slitting equipment, how to avoid excessive wear and obtain best results in slitting, what design features are desirable in slitting line units, are among the subjects discussed in this third and concluding article of the series

PART III

determining the size of slitter units most suitable for any given plant, the relation between the actual slitting requirements of that plant and the potential slitter production should be taken into account, as well as the size and weight of coils, thickness of stock and the number of cuts to be made to the width. In other words, it is necessary to distinguish between the capacity of a slitter in terms of tonnage it will produce per hour, and its capacity in terms of coil weights and stock dimensions that it will handle. To avoid confusion, the former is generally referred to as potential output or production and the latter generally as capacity. Choice is complicated by the fact that the potential output from any given size of slitter unfortunately is not a fixed quantity.

A daily output of 40 tons in one shop has been mentioned as good for a 36-inch standardized slitting line.

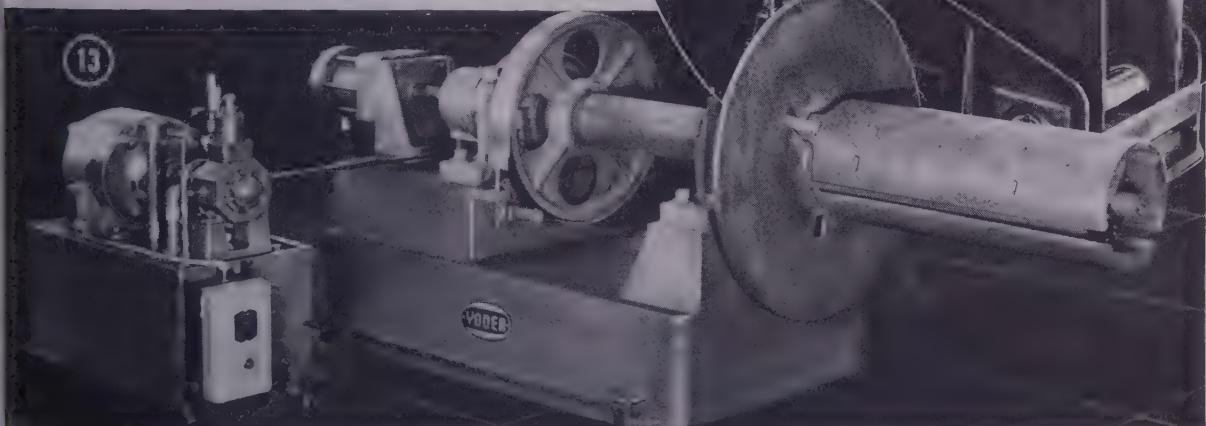
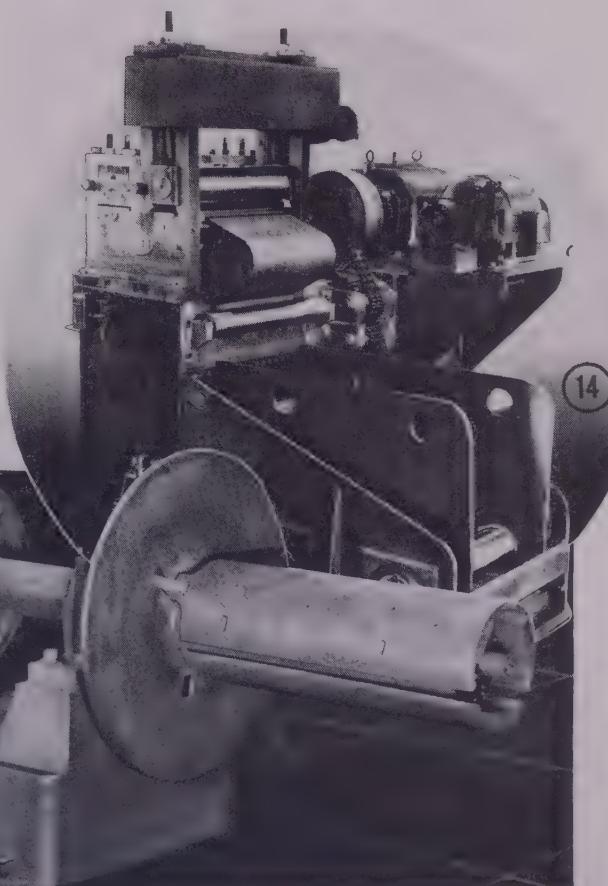
Fig. 13—Standardized expanding drum type uncoiler, made in different sizes and drum lengths, and equipped with floor-mounted hydraulic unit for expanding drum

Fig. 14—Coil box, equipped with brakes and power-driven uncoiling rolls, pinch rolls and other features, for handling heavier gages such as used for pipe and tubing

By EUGENE L. MACKAY
Design Engineer
Yoder Co.
Cleveland

with coils weighing about 5200 pounds, making eight cuts, while the average for the 14 jobs in Table III figures out to about 18 tons per day.

It must be remembered, however, that nine of these 14 jobs consisted of unusually small coils and that the best production from this medium size line in this period was nearly 45 tons per day (Job No. 3). Therefore, if it is found that the tonnage to be slit falls far short of the potential slitter production, it will be advisable to take this into account by choosing units



for the slitting line which are smaller rather than larger than that indicated when considering merely coil weights, stock thickness, width and number of cuts.

If, on the other hand, it is found that the slitter will probably be kept busy most of the time, a unit, or combination of units, larger than actually required may be installed so that they may use larger coils or make more cuts per width, and at the same time also provide extra capacity for future expansion of the business. Reason for giving such careful consideration to the size and capacity of slitter units will become apparent when quotations are obtained. It may make a difference of anywhere from \$5 to \$15,000 in the initial investment.

Coil Weight Overestimated—It has been found that many prospective purchasers not only fail to take into account the large potential capacity of multiple gang slitters, but that they are also likely to overestimate the maximum weight of coils to be handled.

Take a concrete example. A prospective buyer asks for prices on a slitting line for stock having a maximum width of 24 inches, in thicknesses up to 0.094-inch, cutting a maximum of 6 strips to the width; maximum coil weights are given as 10,000 pounds.

Dividing 10,000 by the width of 24 inches, we determine the weight per inch of width to be 416 pounds. From Table VI, we find that a coil with the core diameter of 16 inches, having a weight per inch of width of 407 pounds, would have an outside diameter of 48 inches. When this fact is discovered, everybody realizes something is wrong. Upon further investigation it is found that the largest coils heretofore used have been only 36 inches in diameter.

By consulting the same table again, we find that a 36-inch diameter coil weighs only 207 pounds per inch of width, giving a total coil weight of $207 \times 24 = 4968$ pounds, or only about half of the weight first stated.

Potential output of a standard slitter may be smaller than the customer's actual requirements. In this case, the choice lies between buying two slitters, or a larger one, possibly of higher speed, or of using one standardized slitting line of medium size and

speed, with the addition of one or two coil cars.

Capacity Ratings—Capacity ratings of slitters should be governed, first, by arbor deflections and stresses. Shaft diameters therefore become the measuring stick. Weights and overall dimensions of machines, as well as of important components, including motor, transmission gears, bearings, etc., must as nearly as possible be made to match.

Most slitter operators will, when occasion arises, overload their machines without serious results as to accuracy, excessive burr, or breakage of shafts and other parts. Overloading is a practice which is seldom justified, for it unduly increases wear and tear and hastens ultimate breakdowns and failures from fatigue and other causes, even under stresses and loads which appear to come within the rated capacities of the machines, as explained in the following.

Overloads and excessive wear and tear can be created by causes other than that of exceeding capacity ratings in terms of number of cuts and thickness of stock. The causes most frequently observed are chipped and dull cutters; insufficient clearance between cutters; lack of parallelism in arbors; looseness of arbor adjusting screws due to excessive wear; excessively tight stripper fingers; folded-in edges of stock, causing edge trim cuts here and there to be made through double-thick metal; hard-to-cut special analysis metal; badly balanced cutter setups, implying excessive loads on shafts when making a large number of cuts in heavy stock.

A combination of two or more of these conditions may create overloads sufficient to wipe out the safety factors, even when the number of cuts and stock thickness are within the safe rated capacity of slitting machines.

Balanced Cutter Setups—Operators are in the habit of trying to make all the cuts on the drive side of the machines, starting their cutter setups as close to the inside shoulders of the arbors as possible, bunching all or most of the cuts to the right of the center line of the machine, as figured from the coil side, because that seems the easiest and simplest way of doing it. There is nothing especially wrong with this kind of setup so long as theoretical loads come well within maximum rated capacities. W.

Fig. 15—Seven-roll strip flattener, for taking curve out of coiled sheets in cut-up line

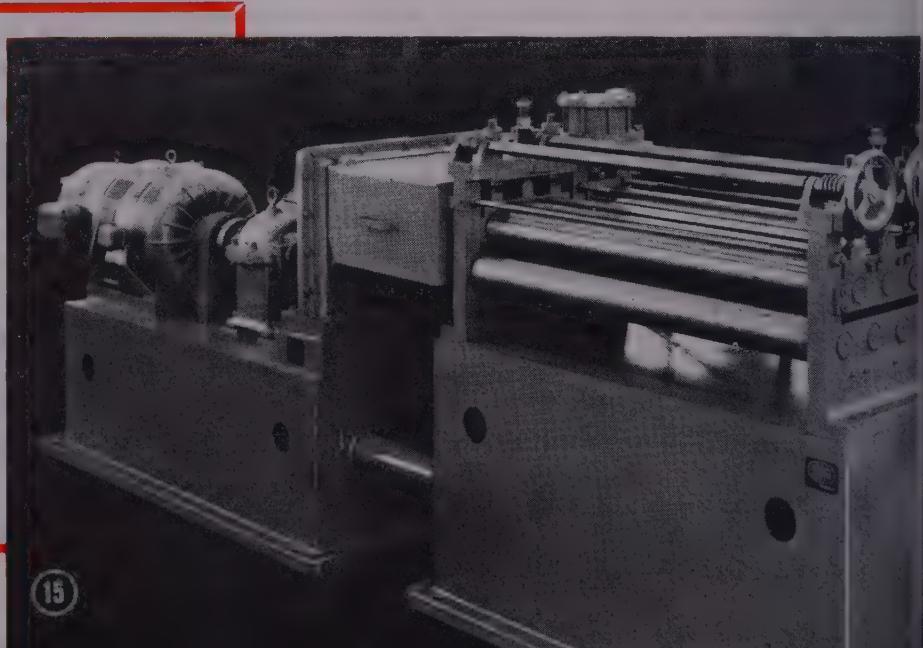


Fig. 16—Slitter operator replacing outboard housing after change of cutter setup

Fig. 17—Slitter with outboard housing swung completely to one side to facilitate change of cutter setup

TABLE VI
APPROXIMATE WEIGHT (POUNDS) OF COLD ROLLED STEEL COILS
1 INCH WIDE

Core Diameter	24	26	28	30	32	34	36	38	40	44	48	54	60
12	88	106	128	151	176	203	231	260	291	358	432	554	691
16	64	84	105	129	153	179	207	237	268	335	407	529	664
18	50	70	91	115	139	165	193	223	254	321	394	516	650
20	35	55	76	100	124	150	178	208	239	306	379	501	635

TABLE VII
STANDARD SLITTING SPEEDS
FULL TYPE SLITTING LINES

Recoiler Drum Diameter Inches	Min. Speed	30-inch Dia.	36-inch Dia.	40-inch Dia.	44-inch Dia.	48-inch Dia.
12	168 FPM	422 FPM	507 FPM			
16	225 FPM	422 FPM	507 FPM	563 FPM	620 FPM	675 FPM
20	225 FPM	338 FPM	405 FPM	450 FPM	495 FPM	540 FPM

Note: The above minimum speeds are measured around the expanded drum circumference of recoiler at start of rewinding, while the maximum speeds are figured around the coil circumference at end of rewinding, the R.P.M. being constant through the entire operation.

are approached, however, it is much better to distribute the load as evenly as circumstances permit left and right of center line through the arbors. Slightly different considerations apply to the determination of uncoiler and recoiler capacities. Here, shaft stresses rather than deflections become the limiting factor in handling heavy coils. Long life, low maintenance cost and ability to perform satisfactorily under maximum loads, depend on much the same factors as in the case of slitters.

Design Features of Slitting Line Units—Drum type uncoilers should be provided with drag brakes of sufficient capacity to function satisfactorily under normal operating conditions. One of their functions is to prevent over-running or rewinding at a faster rate than the slitting speed, another to provide the tension necessary for reasonably tight rewinding of the slit ends, and to prevent telescoping.

Under certain conditions a coil box may be used instead of an uncoiler. A simple coil box consists of a box enclosure having adjustable sides for different coil widths, and four or more idler rolls on which the coils revolve. Coil boxes are easier to load, sides being lower in first cost than uncoilers, but their application is limited to slow speeds, on coils of relatively small diameter and width, and on stock which is neither too thick nor too thin.

Special coil boxes, provided with brakes and power uncoiling rolls, pinch rolls and other features,

are furnished for specific applications unrelated to slitter operation.

Miscellaneous Uses—Coil boxes and uncoilers are used not only in slitting lines, but also for feeding other production machinery, such as electric pipe or tube mills, cold roll forming, cut-up lines, and the like. When an uncoiler is installed in a cut-up line, it is usually in combination with a strip leveler and upcut shear, with a looping table between the leveler and the upcut shear for feeding thin sheets through the upcut shear.

If the leveler is used for converting coiled stock into flat sheets which must meet the usual tolerances for flatness, it will have a larger number of rolls—usually eleven or more. For stock which is fed directly into a production line, a smaller number of rolls is usually sufficient. In this case the machine is referred to as a flattener. In a flattener, only five rolls are needed.

Slitters—Standardized slitters usually include an entry table, attached to the base of the machine, mounting a pair of idler rolls and side guides, both adjustable, one to the desired height and the other to the width of stock being slit. The strip next enters the feed rolls, which are driven and separately controlled. They aid in guiding the stock straight, especially when the lead end is not cut square. They further reduce wear on the stripper fingers and help flatten the damaged edges of strip. The greater the



thickness of stock and the number of cuts to be made, the more difficult it becomes to enter the stock between the cutters without the use of feed rolls. For stock thickness over 0.040-inch feed rolls are, therefore, essential to full utilization of the machine capacity in terms of number of cuts that can be made in one pass through the machine.

Exit side of the slitter should be equipped with a pair of exit idler rolls, adjustable vertically to maintain the strip in a level position. On sheet slitters, the exit guide rolls must also serve as pull-out rolls, hence they are driven. On standard pull-type coil slitters they are simply idlers.

To save time in changing cutter setups, the ends of the arbors must be easily and quickly accessible. It should be possible to swing the outboard housing out of the way, so that the operator can change tooling in the shortest possible time. The top spindle should be equipped with a micrometer dial at each end so that the screw adjustment of the spindle can be quickly and accurately made, it being of importance to obtain true parallelism between top and bottom arbors and correct spacing between them to match varying cutter diameters and stock thicknesses.

Toggle Gearing—Although the gearing of a slitter in a pull-type slitting line is driven only for the purpose of threading, the incorporation of toggle type idlers is essential to efficient, economical performance of the machine. Toggle gears are designed to maintain full pitch line mesh of the gear teeth over the widest range of adjustments of the top arbor in relation to the bottom one. This not only reduces wear and breakage of the gear teeth but also increases useful cutter life because the arbors can be adjusted over a wider range, to compensate for gradual reduction in cutter diameters by repeated regrinding. Before buying a slitter it is, therefore, advisable to ascertain the amount of regrinding the cutters can stand before they must be scrapped.

Capacity of slitters varies with the thickness and

length of the arbors, and also with the use or non use of removable cutter sleeves. Removable cutter sleeves are designed to reduce the idle time of the slitter where much slitting is done which requires frequent changes of cutter setups, or repeated use of the same setups. The sleeves permit separate assembly of the cutters, so that the change from one slitter setup to another can be accomplished in much less time.

Many slitters afford a choice of two different arbor diameters. The smaller diameter is always necessary when cutter sleeves are to be used. Add the thickness of sleeves, the overall diameters become identical with, and the capacities only slightly lower than, those of the larger size solid arbors. The machining of sleeves to the exceedingly fine tolerances required for this application is a difficult matter, difficulties as well as cost increase with length. Cutter sleeves are, therefore, usually recommended for the narrower strip widths up to 24 inches.

Smaller arbors are sometimes chosen because cutters and spacers of smaller diameters can then be used, at a saving in first cost and replacements. Cutter replacement is an item of some consequence during the lifetime of a slitter, since cutters are constantly reduced in diameter by grinding, until they have to be discarded or used for spacers.

Slitting and Threading Speeds—Minimum slit speeds of standardized pull-type slitters are governed by the recoiler speed, which ranges from 150 to 250 fpm measured around a standard 16-inch drum.

As the minimum speed is measured around the 16-inch drum, 168 fpm on a 12-inch drum is equivalent in revolutions per minute to 225 fpm on a 16-inch drum. The revolutions per minute remain the same. A maximum of two or three times the minimum speed can be reached at the end of rewinding, depending on the coil diameter. It will be understood that, since the operating speed in terms of revolutions per minute is constant, the speed in feet per minute increases in direct ratio to the coil diameter as it is being built while being rewound.

Minimum and maximum speeds for different diameters are given in Table VII.

While these speeds are obtained in many standardized pull-type recoilers, equipped with standard size motors and gear reducers, the same slitting machine can be equipped for almost any operating speed.

Slitters have been built for speeds upwards of 250 fpm, but the extra cost of such slitters is not warranted except where big tonnages of large coils are to be slit, especially of light gage stock, such as aluminum and silicon steel. Even with standard speed, a coil of average length will go through the slitter in a few minutes. Also, even with relatively high speeds, from five to ten times more time is normally spent in the other operations of loading, unloading, threading, etc. Where large tonnages are to be handled, operators therefore often find it more profitable to provide equipment for more expeditious loading and unloading of coils than to have the slitter and recoiler specially equipped for higher speed.

Sheet and Drive Slitter Speeds—Standard speed of sheet and drive slitters is (Please turn to Page

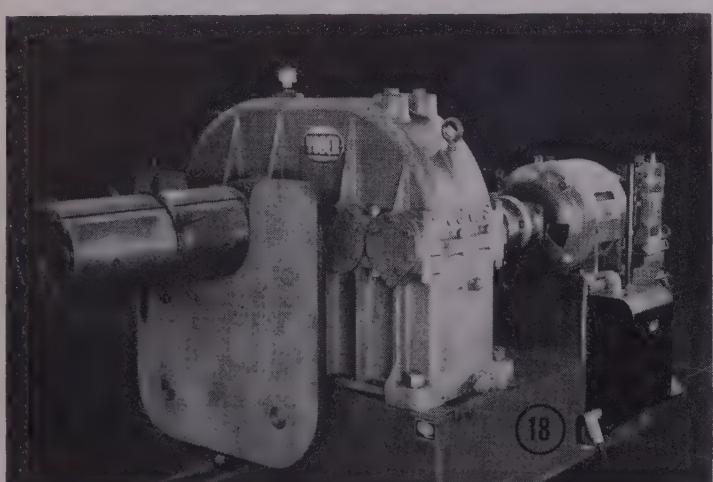


Fig. 18—Standardized pull-type recoilers are made in different capacities and drum lengths, with or without stripper plate. The latter is usually operated by compressed air from shop line, but may for finer control be equipped for operation from hydraulic unit on uncoiler

SATIN FINISHING STAINLESS PRODUCTS

Architectural and decorative effects required of stainless steel in various applications present varied finishing problems whose solution may be found in utilizing coated abrasive belt polishing machines or special brush-backed finishing tools

By FRED LITTLEJOHN

Fred G. Littlejohn Co.
Los Angeles

PROCESSING stainless steel into consumer products and its application for architectural and decorative effect presents varied finishing problems in which coated abrasives play an important role. Product engineers have frequently encountered these problems but have not always found the ideal solutions. Difficulties center principally around the problem of employing mechanical means for blending a satin finish, as received from the mill, on surface areas or spots that have been marred or stained as a consequence of arc and spot welding, machining, grinding or handling.

Instances where stainless is specified for tanks, pots and trays of various types for use in chemical, petroleum, dairy product and food processing, the main problem is necessarily to eliminate all nicks, deep scratches and other surface flaws and not the attainment of a finish to lend "eye appeal." These surface defects would tend to facilitate chemical attack by acids, hydrocarbons, etc., and would also multi-

ply the problems of cleaning to prevent contamination of products being processed through such equipment. Methods employed to finish such apparatus requires the use of grinding and abrasive impregnated rubber wheels. In a sense, the finishing of stainless does not present the wide variety of problems as do most other ferrous and nonferrous alloys. There is no need for chromium plating, anodizing, enameling or painting. The aim is to achieve a uniform satiny luster.

Belt Polishing—To accomplish this, the mill utilizes wide, coated abrasive belt polishing machines. These are usually composed of a reciprocating table upon which the sheet of steel is clamped. The sheet is moved forward and backward under an endless belt which travels vertically to the table. Another type of machine feeds off sheet strips from a spool, passes the stock under the belt and winds up the finished material on another spool. The entire abrasive area of the polishing belts that are used

1—Special machine connected to satin-finish commercial refrigerator door frames. A 1/2-hp electric motor drives the main shaft which extends the full length of the frame on which the five polishing wheels are mounted. Each wheel is mounted on individual pillow blocks driven by a belt off a pulley on the main shaft. Pillow blocks are staggered diagonally across the frame in order to position the polishing wheels so they hit the outer edge of the door frame at graduated angles. Machine itself is in a fixed position. Door frame is moved along the track. Wheels run at approximately 1200 rpm

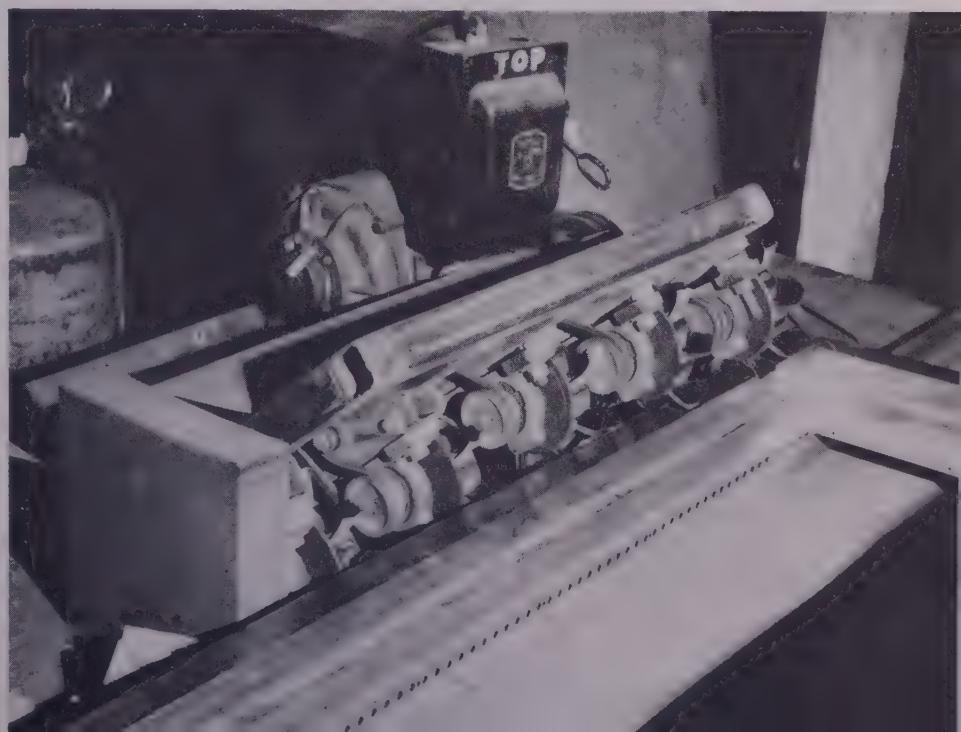




Fig. 2—Ice cream and deep freeze cabinets are shown here being satin-finished with sanding wheels mounted on portable electric drills. Courtesy Webe Showcase & Fixture Co.

with grease stick No. 2. Surface of the steel is then further processed by polishing on an oscillating drum mounted over a reciprocating table. These buffs are treated with polishing compounds, thus developing a No. 7 finish. In some places the final coated abrasive polish with No. 400 grit might be supplemented with an additional operation on a setup drum with No. 600 being used as the cutting medium. This additional operation produces No. 8 mirror finish when followed by oscillating drum and chrome rotation.

Specialized Equipment—The obvious necessity for specialized grinding equipment is apparent by the account of mill practice. Fabricators of stainless steel, of course, are usually interested in setting up to perform such operations. The equipment adequately produces the finished stock to specification. No problems of finishing are thereby encountered by the user until he begins his operations of forming, welding, etc. brush-backed sanding-finisher manufactured by Merit Products Inc., Los Angeles, Calif. may be used blending in a satin finish on stainless steel after the forming and welding operations. The principle employed by this tool, designated Sand-O-Fil, involves the use of brushes merely as backing or as a cushion for strips of coated abrasives. The latter unwind from a central cartridge inside the wheel through slots in the housing, one strip in front of each brush. The "paint brush" action of the wheel, as it turns on the shaft or spindle on which it can be attached, produces the desired finish.

Pressure exerted by the brush is at a maximum from a point where the abrasive first strikes the surface being finished up to the point where the surface is 90 degrees to the axis of the wheel. From there on, the pressure of the brush on the abrasive strip becomes less and less until the abrasive lifts from the finished surface. Scratches left by the abrasive are in parallel lines and diminish in depth as pressure from brush lessens.

Produces Stainless Filters

QUANTITY production of permanent Oilite stainless steel filters suited to the chemical industry is taking place at the Amplex Manufacturing Co., powder metallurgy division of Chrysler Corp., Detroit.

is usually greased by rubbing with a grease stick. The heat generated by contact with a special "breaking-in" sheet of steel which has also been coated with grease causes the grease to melt and spread uniformly over the grit on the belt.

Standard practice in most mills calls for the production of sheet material with a No. 4 finish, or better. Except for one instance, three operations known as rough grind, intermediate grind and polishing are required to obtain this finish. These are performed with closed coat, aluminum-oxide paper belts. The exception comes when a No. 240 closed coat, silicon-carbide paper belt, following the use of a No. 120 closed coat aluminum oxide paper belt is employed to obtain a super No. 4 finish. Grits chosen are dependent on condition of steel and no set sequence of selection is possible as a result. Normally, the following data, relative to the condition of the steel, are used in making the proper grit selection: Grit numbers used to obtain a standard No. 4 finish:

Hot rolled sheets—Nos. 36, 60 and 120

Medium grade 2B sheets—Nos. 50, 80 and 120

Good grade 2B sheets—Nos. 60, 80 and 120

Exceptionally good 2B sheets—Nos. 80 and 120

For super No. 4 finish, add grit No. 240, silicon carbide paper to any of the above.

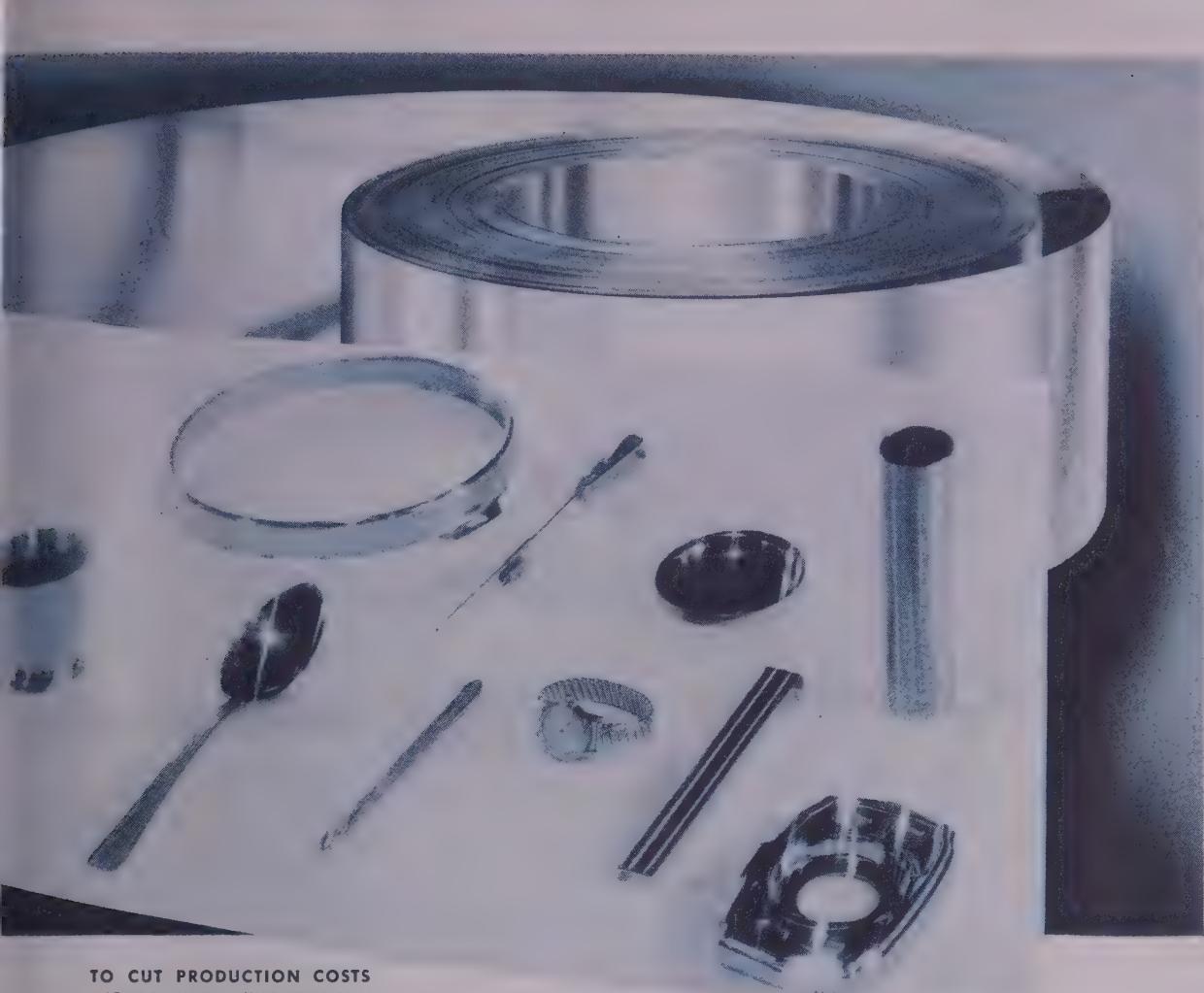
No. 120 grit is generally accepted

for final polishing, although some steel mills do use No. 150 grit.

Lubrication of Belts—Lubrication of the coated abrasive belts is of vital importance on all operations. On the rough grind, a mixture of kerosene and lubricating oil is used for the purpose of minimizing heat. This mixture is generally 50-50. Warm palm oil and kerosene are commonly used for the "intermediate" belt operation, or if the initial grind is with grit No. 60 or No. 80. Palm oil has a heavier viscosity than machine oil and kerosene. It consequently acts not only as a means of eliminating frictional heat but also of providing lubrication. This prevents abrasive marks from becoming too deep.

Individual steel mills specify the mixture of palm oil and kerosene, depending on requirements. Standards applied are based on the fact that an excess of palm oil yields superior finishes, whereas greater amounts of kerosene result in greater production life of the abrasive belts. The final polishing operation is then performed with No. 120 or 150 in conjunction with Matchless grease stick No. 2, as manufactured by Matchless Metal Polish Co., Glen Ridge, N. J.

Attainment of even high lusters is usually accomplished by polishing the sheets with belts of finer grit numbers after the No. 4 finish has been produced. In general, grits No. 180, 240 and 400 closed coat, aluminum-oxide paper belts are used. In all cases, the belts are well greased



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Rotary Gang Slitting

(Concluded from Page 80)

usually about 150 fpm. What has just been said about the cost of higher speeds for pull slitters, also applies to sheet and drive slitters. Special equipment for operation at high speeds is profitable only when the tonnage to be handled is so great that it equals or exceeds the potential capacity of the standard speed machines.

Threading speed of pull slitters is usually about 150 fpm, this being the speed at which the lead end of each coil or sheet is advanced through the slitter for attachment to the recoiler drum before starting to slit at the regular operating speed. Power for threading in all cases is furnished by the slitter motor and is separately controlled.

Recoilers — Standardized recoilers are available in several sizes, the largest sizes usually rated for handling coils up to about 15,000 pounds, where low tension is required, and up to about 11,000 pounds for a tension of about 3000 pounds. The higher the tension required, the lower the weight of the coil will be which can be handled by a given size of machine.

To determine the correct size of recoiler for a pull-slitting line it is necessary first to determine the tension required, not only to pull the strip through the slitter, but also to insure reasonably tight rewinding. The first is known as slitting tension and the latter as rewinding ten-

sion. If the required slitting tension is found to be greater than the rewinding tension, it governs the choice, and vice versa. In other words, the larger figure always governs the choice.

458 Below Attained in Tests

HOW matter behaves at temperatures a fraction above absolute zero is being tested in a new cryogenics laboratory at the Westinghouse Research Laboratories, Pittsburgh. Custom-made temperatures down to 458° F below zero, and with special techniques to within one-tenth of a degree of absolute zero, 459.7° F below zero, show that the nature of matter undergoes radical changes and behaves in a mysterious manner, reports state. It has been found that liquid helium flows uphill and the flow of electricity in a wire encounters no resistance.

Many of these facts have been known for years, but the scientists are endeavoring to find out why they should happen. Normally, electricity flowing through a wire needs resistance and loses some of its power in the form of heat. If the circuit is immersed in liquid helium at a temperature of about 452° F below zero, it continues to carry current even though the source of electricity is shut off. The laboratory calls this strange behavior super-conductivity. It is thought that if it could be properly harnessed, it might mean much more efficient and cheaper distribution of electricity.

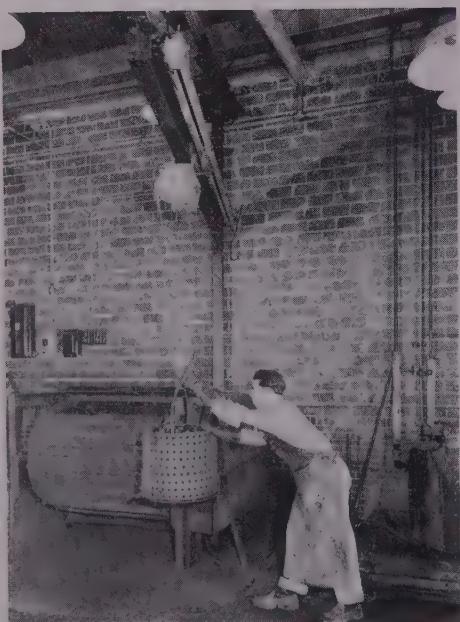
Only thirteen metals are super-

conducting at subzero temperatures, it is reported. Among these are umbium, tantalum, vanadium and their alloys. A major aim of research is to find metals or alloys that are super-conducting at high temperatures, thus reducing the problem of refrigeration.

The laboratory takes helium in at one end and, in a series of steps, produces liquid helium at the other end. Its liquid temperature of 452° F below zero—about 8° above absolute zero—is reduced to a fraction of a degree above absolute zero by additional methods. All through the process electronics and mechanical controls take over, enabling the scientist to keep a constant check on subzero temperature production. Helium is stored in tanks lining the ceiling of the laboratory. Liquid helium is returned to its gaseous form at use and recirculated into the storage tanks.

Air Force Selling Guide Offer

PROCEDURES which any organization with goods and services to offer to the United States Air Force follow to insure fair and impartial consideration in contract bidding are outlined in a booklet, "A Guide to Selling to the United States Air Force" available at the seven Materiel Command field procurer offices. Addresses of the offices are: New York AF Procurement Field Office, 67 Broad St., New York 4, N. Y.; Dayton AF Procurement Field Office, Wright-Patterson Air Force Base, Dayton, O.; Ft. Worth AF Procurement Field Office, Government Aircraft Plant No. 4, Fort Worth, Tex.; Detroit AF Procurement Field Office, W. Warren and Lonyo Ave., Detroit 32, Mich.; Chicago AF Procurement Field Office, 209 W. Jackson Blvd., Chicago 6, Ill.; Boston AF Procurement Field Office, Boston Air Force Base, Boston 10, Mass.; Los Angeles AF Procurement Field Office, 1550 Washington Blvd., P. O. Box 3200, Terminal Annex, Los Angeles, Calif.



SPEED FINISHING: One of two electric hoists handling 40,000 air brake hose clamps per week through finishing operations at Union Switch & Signal Co., Swissvale, Pa., is shown operating between a caustic tank and a tumbler. Trolley-mounted, on a jib, the hoist moves the clamps from step to step in metal buckets. On an overhead I-beam and similarly-mounted is another electric hoist, also made by Yale & Towne Mfg. Co., Philadelphia. The second hoist services sulphuric acid, cold water, soda-ash, cold water, cyanide, zinc plating, hot water and steam-drying equipment after caustic and tumbling operations.

Stud Welding Speeds Installation

ELECTRIC-ARC stud-welding has been adopted for the attaching of 0.032-inch industrial corrugated aluminum roofing and siding directly to structural steel framing members according to Reynolds Building Products Division, Reynolds Metals Co., Louisville, Ky. Inasmuch as the welding method, developed by National Stud Welding Division, Morton Graphic Corp. is fast, it offers possibilities in reducing application costs, the company states.

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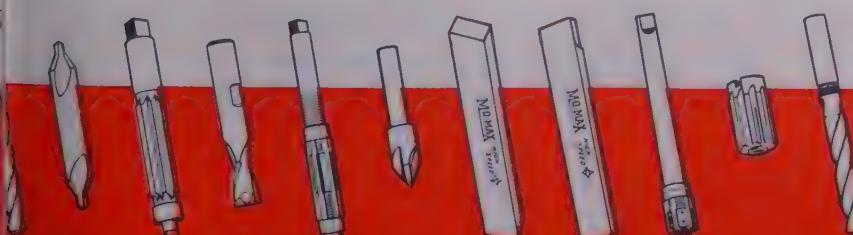
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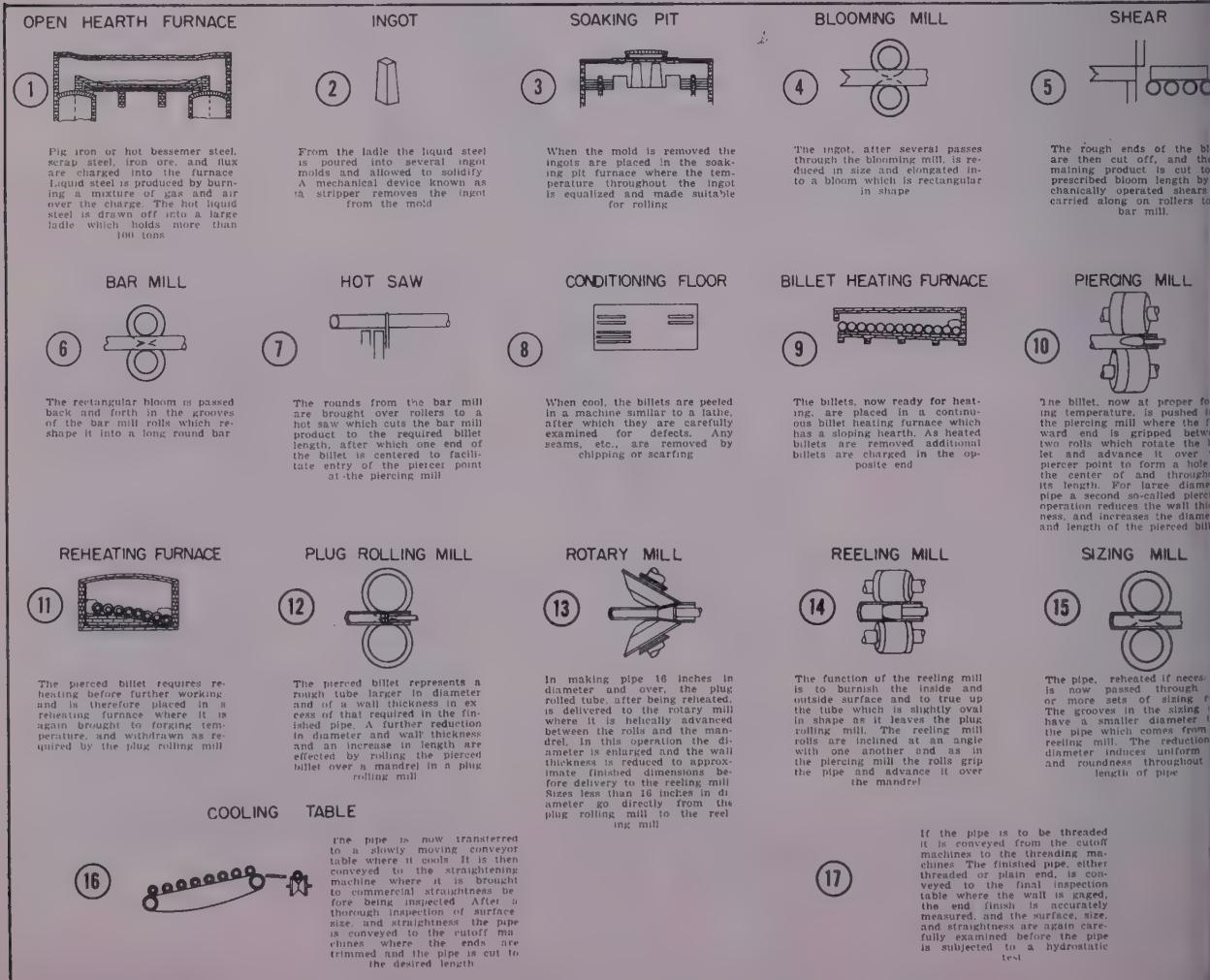
PART I

MANUFACTURE of seamless tubular products dates back to 1885 when the Mannesmann brothers in Germany discovered that reducing the diameter of a solid round bar by cross rolling between two rolls tended to produce a ragged opening along the longitudinal axis of the bar. It was the a logical step to introduce a mandrel or point over which the bar was rolled, thus forming a cylindrical shell. This operation is termed piercing a billet and is still employed as the first step in the fabrication of the

major tonnages of seamless steel pipe. The following description contemplates the use of a roll-type piercing mill.

Fig. 1 illustrates diagrammatically what is involved in converting molten steel to pipe ready for the finishing operations. Open hearth steel is ordinarily basic material, although with the exception of

Fig. 1—Sequence diagram illustrating steps involved in the conversion of molten steel into pipe ready for finishing operations



MAINTENANCE CUT

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Photographs courtesy Ford Motor Company



KAOCAST, easy to use as ordinary concrete, can be mixed in mortar box or concrete mixer.



Shell of furnace door, cleaned, ready for installation of KAOCAST.



Shoveling KAOCAST into place. KAOCAST can also be poured like ordinary concrete, plastered in place, or applied with a cement gun.

A large automobile manufacturing firm found that high temperatures and severe operating conditions were playing havoc with the doors of their 15-ton electric furnaces. Run 16 hours a day, 5 days a week, these furnaces are poured every $2\frac{1}{2}$ hours and are charged twice during each cycle. With a good grade of firebrick, furnace door linings lasted an average of only two or three days before replacements were necessary.

A trial installation of KAOCAST —

the B&W high temperature Refractory Castable — was made. The KAOCAST doors stood up two to three weeks . . . five to eight times longer than firebrick. As a result, doors on all electric furnaces of this type are now lined with KAOCAST. *Savings in maintenance are running into thousands of dollars per year.*

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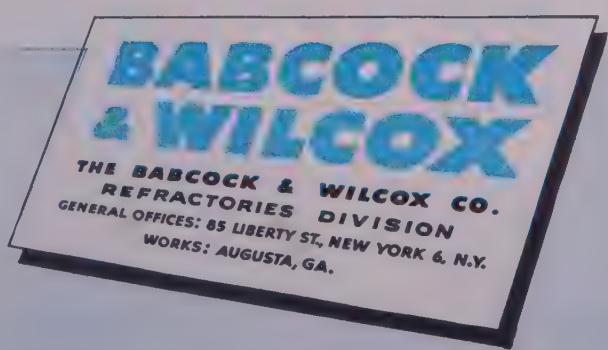


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Seamless Steel Pipe and Tubes



The author, Bryant Bannister, was born in Illinois in 1887. He received his bachelor of science degree from the University of Illinois and subsequently took a year's graduate work at Massachusetts Institute of Technology. While in college he was elected to Tau Beta Pi, national honorary engineering society.

He started with National Tube Co. as a draftsman in 1912, becoming power engineer in 1915. He held this position until 1932 except for a one year period spent as power engineer for the United States Steel Corp., Ordnance Dept. In 1932 he was appointed assistant to the vice president of National Tube Co. in charge of process development engineering. In 1944 he was named consulting engineer, which position he holds today.

He is the inventor of many processes and devices largely pertaining to steel pipe manufacture. Perhaps the best known item is the geometric piercing pass used almost exclusively by the seamless pipe industry.

first diagram, the same sequence of operations would be employed in producing seamless pipe from deoxidized acid bessemer steel.

Legends beneath the diagrams indicate the general function of each operation. The first six diagrams illustrate operations that are common to most steelmaking units. The seventh diagram, illustrating the hot sawing of rounds, is common to many other processes. However, preparing the round for piercing introduces the first innovation. To facilitate entry of the piercer mandrel or point into the round during the piercing operation, a central cup-shaped cavity is impressed in one end of the billet or round while hot.

After the rounds have cooled, they are inspected and conditioned. This operation is quite critical, because thorough removal of surface defects is necessary to

Fig. 2—Geometric piercing pass which is used substantially by all seamless pipe manufacturers today

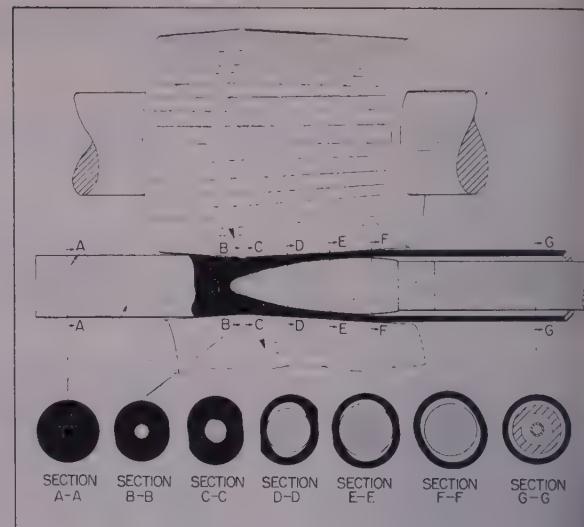
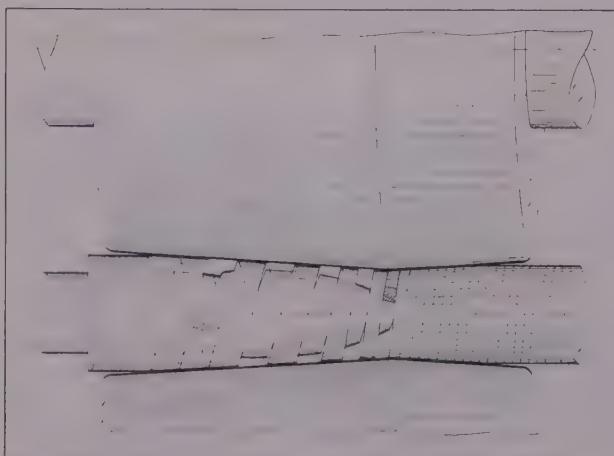


Fig. 3—Piercing operation—showing various cross sections of material during pass

eliminate seams which would carry through to finished pipe, causing rejection.

The billet heating furnace illustrated is of conventional roll down type wherein billets are slowly rolled by gravity and manual control down the hearth towards a discharge door. Greatest objections to this type of furnace are the high cost of labor involved and the uncertainty that in rolling the billet, all surface areas are exposed to the same heating effect. Obviously, a uniform temperature across the billet section is necessary for proper piercing action. This varies for the type of steel being processed, ordinarily being approximately 2200° F.

In recent years, the rotary hearth type of furnace has been developed. In this furnace, the billet is placed on a hearth which rotates, billets being spaced by at least one billet diameter. This method allows radiant exposure, either direct or by reflection from the hearth, to the entire billet surface at all times. The billet travels through three or more heating zones which are automatically controlled to provide proper temperature conditions throughout the travel from charge to discharge doors. Thus, all billets are subjected to the same heating cycle and sufficient time is provided to insure temperature uniformity. Operation of a rotary hearth furnace requires approximately five less men than does a roll-down furnace.

Recently, consideration has been given to a furnace for heating billets which comprises a straight-line series of barrels equipped with radiant type burners. Material is carried through this tunnel-like structure on rolls which are slightly skewed, causing the billet to turn slowly as they proceed through the furnace. Rate of radiant heat input is extremely high, thus shortening the time of exposure to oxidation and minimizing scale loss. Operating labor is reduced to a minimum. This type of furnace has not been completely commercialized as yet but appears to have all the advantages of the rotary hearth furnace, low installation cost and maintenance expense.

We now come to the piercing operation which, for many years, departed only in minor detail

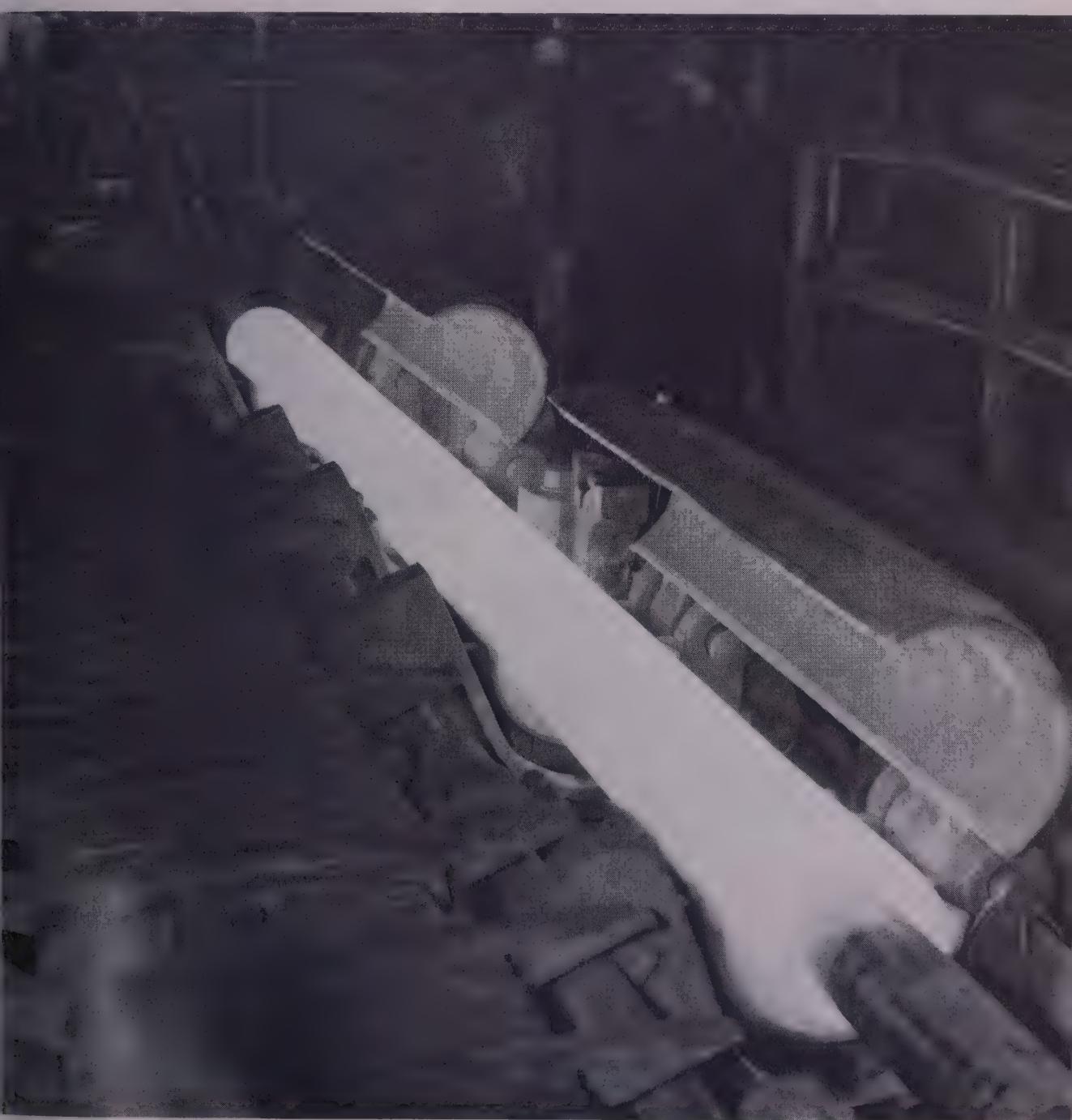
in the earliest conception of what was required to pierce a billet. Designers, or perhaps the mill operators, would make individual changes such as roll profiles or the piercing mandrel without due regard to the overall effect of such a change, the result being that metal flow from the inlet to the outlet of the piercing pass was far from orderly. For example, in one section of a pass, the action might be to feed metal forward at a greater rate than an advanced section could absorb it. In some instances, the reverse action took place. This push and pull action had the effect of causing abnormal

stresses to be set up in the billet which showed up as defects such as seams, laps, tears, etc., and generally slowed down billet travel through the pass.

To improve the piercing operation, a detailed study was made around 1934, resulting in development of the so-called "geometric pass" which, with slight modification is today employed by substantially all seamless steel pipe manufacturers.

Fundamentally, the geometric pass is based upon the fact that in the piercing operation, the same volume of metal per unit of time must pass any transverse section of the pass. The pass is the combination of the two power driven barrel shaped rolls whose axes are in planes parallel to but inclined in opposite directions to the geometrical axis of the

Fig. 4—View of billet after being pierced and before thrust bar has been withdrawn



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Engineering News

ON ABRASIVE PRODUCTS

Belt Backstand Idler Techniques Effect Operating Cost Reduction

Substantially increased output, lower unit costs and improved finishes are influencing more metal working plants to switch to belt backstand idlers for grinding and finishing flat and contoured surfaces of both small and medium weight pieces. In many factories where set-up wheels were formerly used, conversion from 25 to 100% to the backstand technique has been effected. While these methods normally involve grinding speeds of 6500 to 7000 S.F.P.M. with glue-bonded abrasive cloth belts, speeds of 10,000 S.P.M. are being used widely today with resin bonded belts.

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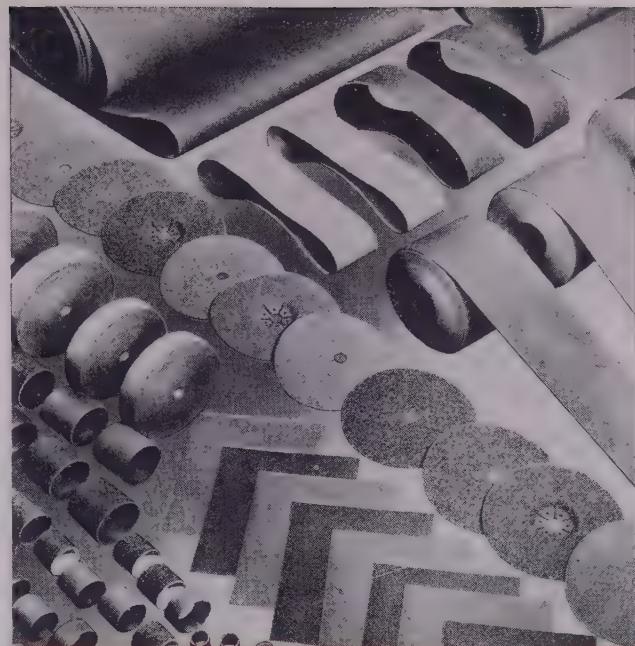
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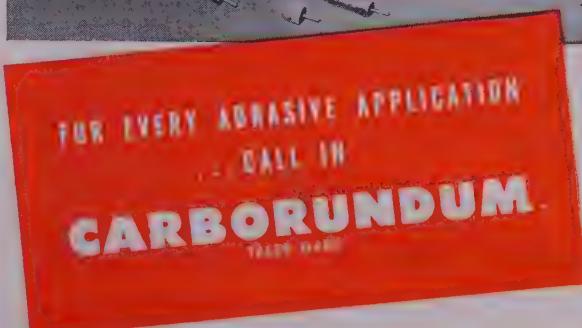
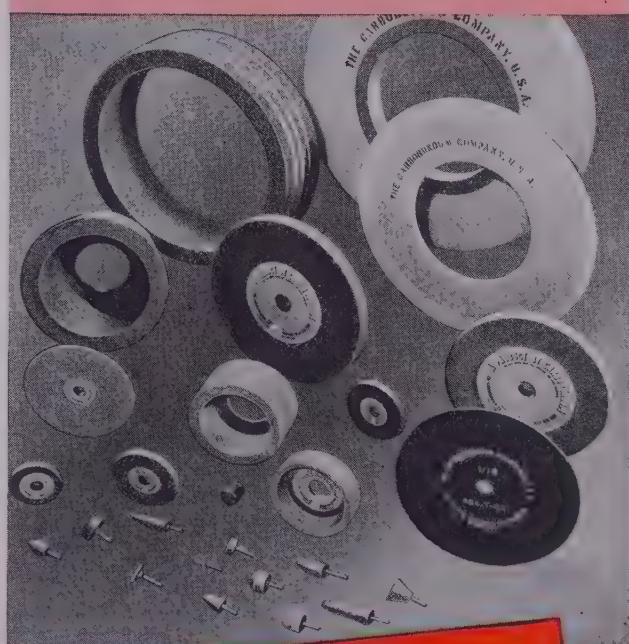


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Seamless Steel Pipe and Tubes

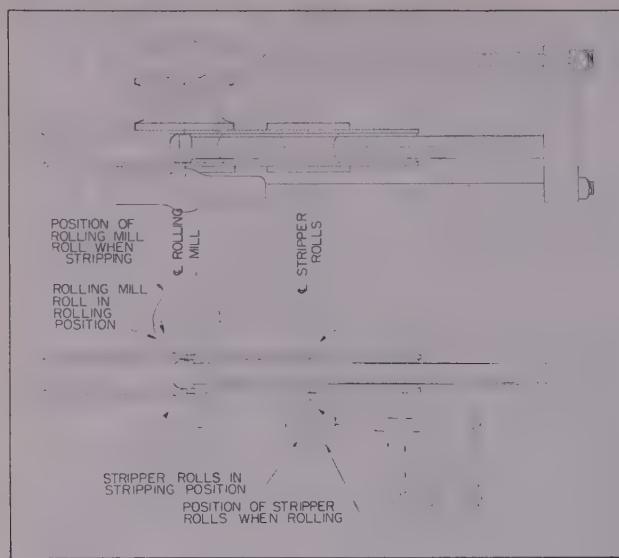


Fig. 5—Diagrammatic sketch of plug rolling operation

mill to provide a feeding effect for the billet which is squeezed and rotated between the rolls. A piercing point disposed between the rolls, the nose or forward end of which is first contacted by the billet, is located slightly ahead of the gorge or narrowest portion of the pass. This point is supported on the forward end of the thrust bar which is free to rotate but restricted from longitudinal movement. Piercing mill shown in the sequence diagram and Figs. 2 and 3 illustrate the above arrangement. Not shown but equally essential to proper functioning of the pass are two stationary guide shoes positioned above and below the billet to locate it in proper vertical position and to limit radial flow of the metal. Without this

limiting feature the billet would expand unduly and a quite improper speed relationship between billet and rolls would be set up.

The term "geometric" is descriptive of the rate at which the billet accelerates in forward travel through the pass. Since the volume of metal flowing forward in the pass is constant at each transverse section, it is only necessary to so proportion the pass elements, described above, that the section area for metal flow decreases towards the outlet at the same rate as it is desired to increase the forward velocity of the billet. For convenience, the advance of the billet for each revolution in the pass is taken as an increment of forward travel. It is obvious that if the cross-sectional area of the pass is decreased by any given amount, the forward velocity of the metal must increase by the same percentage. Thus if for each increment of billet advance it is desired to increase the velocity according to the law of geometrical progression, it is necessary that the difference between successive increment areas be multiplied by a constant greater than one. Advance of the billet from inlet to outlet of the pass is, therefore, accelerating in velocity. Fig. 2 illustrates the incremental advance. Thus, no section of the pass can be retarding the preceding sections. Soundness of this development was demonstrated by the great increase in delivery speed of the piercing mill without increase in peripheral speed of the rolls or feed angle. Another proof of correctness is the ability to process lower cost steel and to produce at a substantially increased rate.

When the rear end of the solid billet has advanced through the pass, a thrust bar over which the pierced billet has telescoped, is withdrawn and billet is "kicked out" of the piercer outlet and transferred to the next operation. Fig. 4 shows a billet after being pierced and before the thrust bar has been withdrawn.

For pipe diameters greater than about 4½ inch it is customary to perform a second so-called pierce operation which further expands, reduces the wall thickness and elongates the pierced billet. This operation is quite similar to the first piercing operation and is performed on similar equipment. The pipe dimensions, of course, are altered to suit the larger diameter product.

Billets, whether single or double pierced, are now processed through a plug rolling or Hi-Mill as it is sometimes called. Before being plug rolled, it is customary to raise billet temperature to about 2200° F. This is especially necessary after double piercing. The furnace generally employed for the reheating is of the roll across type as illustrated in No. 11 of the diagram. Here again, the radiating heat tunnel-type furnace described for heating solid billet deserves consideration.

The plug rolling mill indicated in the diagram, Fig. 12 and Fig. 5, is a relatively simple unit comprising a pair of horizontal grooved driven rolls vertical in line, a thrust bar to support the removable cylindrical plug and a pair of stripper rolls driven in a direction opposite the main rolls. The upper main roll is adjustable vertically, generally by means of a large hand-wheel operating a screw for fine adjustment.



Fig. 6—View of plug rolling mill producing 26-inch OD pipe

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many advantages, Haskelite Plymet is easily worked with simple metalworking or woodworking tools. It can often save man-hours to a point where the final cost of the product may be noticeably reduced. The unique strength and weight characteristics of Plymet are graphically described in the chart below. Write for complete data and samples of Plymet.

Weight in lbs. per sq. ft.	PLYMET UVU			STEEL U.S. STD. GAUGES			ALUMINUM U.S. STD. GAUGES		
	1/4"	5/16"	3/8"	20 ga.	18 ga.	16 ga.	10 ga.	8 ga.	6 ga.
1.01	1.17	1.43		1.5	2.5	4.37	1.44	1.81	2.25
4,000	5,400	13,200		124	575	3,050	872	1,760	3,500

Weight in lbs. per sq. ft.	PLYMET EVE			STEEL U.S. STD. GAUGES			ALUMINUM U.S. STD. GAUGES		
	1/4"	5/16"	3/8"	20 ga.	18 ga.	16 ga.	10 ga.	8 ga.	6 ga.
2.25	2.40	2.56		1.5	2.5	4.37	1.44	1.81	2.25
17,000	26,000	43,000		124	575	3,050	872	1,760	3,500

In the chart above, note that a 5/16" EVE Plymet panel (zinc-coated steel two sides) weighs 2.40 lbs. per square foot. This is less than the weight of 16-gauge steel. However, the resistance to bending of the Plymet panel is about 50 times as great!

Where rigidity is of prime importance, consider the following: A 3/8" UVU Plymet panel (aluminum two sides) weighs 1.43 lbs. per square foot. The weight of 20-gauge steel is 1.5 lbs. per square foot. The Plymet panel, though lighter in weight has 100 times the stiffness of the sheet steel.

In computing the values of Plymet, the following is assumed:
 (1) The modulus of elasticity of steel, 30,000,000 lbs. per sq. in.
 (2) The modulus of elasticity of aluminum, 10,000,000 lbs. per sq. in.
 (3) The modulus of elasticity for the core material, 1,300,000 lbs. per sq. in. along the grain. 65,000 lbs. per sq. in. across the grain.
 (4) The thickness of steel and aluminum, .021" (.27 lbs.) and .015", respectively.
 (5) The weight of plywood plaque, 30 lbs. per cu. ft.

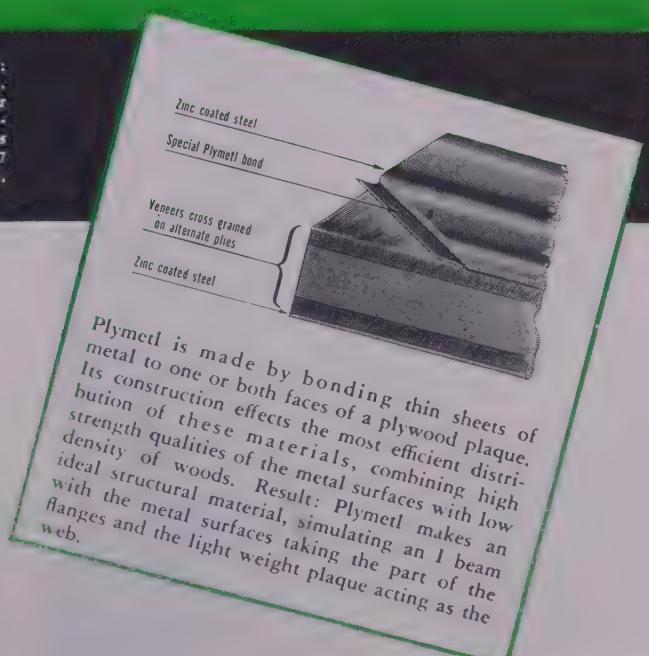
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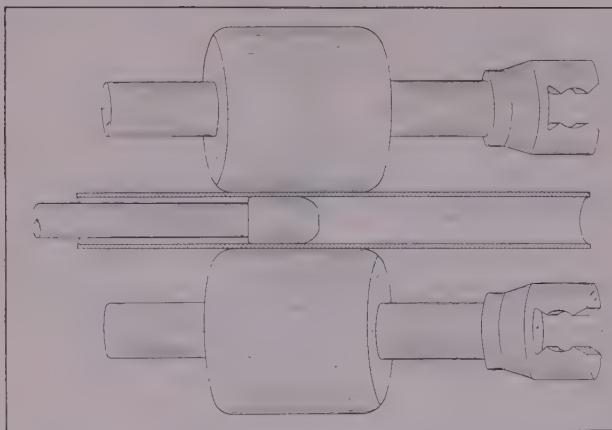
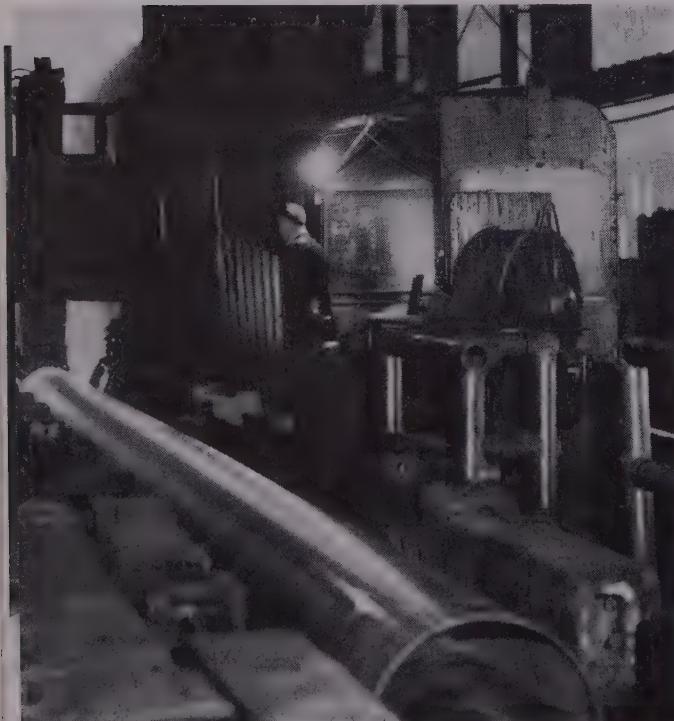


Fig. 7—Reeling operation which smoothes out irregularities and burnishes surfaces of the shell both inside and out

ments and by a hydraulic wedge for larger vertical movements. Stripper rolls are provided with grooves, the top roll being set slightly above the pass line while the lower one is carried on a segment enabling it to be raised to strip the shell back to the entry side of the mill upon completion of the rolling pass and lowered far enough to permit free travel of the shell during rolling operations. Usual procedure is to groove the main rolls with about 100 degrees of each groove concentric with the pass and plug center, with the remainder of the groove being slightly flared. A pusher air-cylinder rams the billet into the pass where the rolls compress the shell against the plug, reducing the wall on about 70 per cent of the circumference and carrying it on and over the plug.

Fig. 8—View of 24-inch OD seamless pipe emerging from reeler



The plug is then removed, upper main roll elevated by means of the hydraulic wedge and stripper rolls brought into engagement with the shell, returning to the mill's entry side. The shell is then rotated 90 degrees and returned to the mill to be given a second pass over the plug. Usually two passes suffice to reduce the wall and elongate the shell but occasionally a third pass is given when the first two fail to elongate sufficiently.

In the interest of economy, it is customary to provide both main and stripper rolls with several grooves, sometimes of different diameters, to permit rolling other sizes without the necessity of changing rolls.

Obviously, it is important to have accurate alignment of roll grooves and to use only plugs having a true circular section as otherwise the roll groove and plug cannot be concentric with each other and a nonuniformity of shell wall will result.

Operations to this stage have produced a shell having approximately the desired average wall thickness and length but further processing is necessary to effect required smoothness and dimensional tolerances. Fig. 6 shows a shell being plug rolled.

Following plug rolling, except for the large diameter products which will be discussed later, the shell proceeds without reheating to one of two reeling mills. These, arranged in parallel, are required to keep pace with the faster preceding operations because of a low delivery rate out of the reelers which, for proper reeling, is due to low feed angles employed. Function of the reelers, which structurally are similar to the piercing mills, (see No. 14 of the diagram and Fig. 7) is to smooth out surface irregularities and burnish surface of the shell both inside and out. Rolls and plug are almost true cylinders presenting long surfaces parallel to the shell wall being reeled. The shell is slightly expanded and shortened in the reeling operation. Fig. 8 shows a 24-inch outside diameter pipe emerging from a reeler. Although it is not standard practice to provide any reheating just ahead of the reeling operation, such reheating would result in a better product, especially for thin wall pipes.

For pipe having a diameter of 16 inches or greater, there is interposed between the plug mill and reeler a second reheating furnace and an expanding mill. The reheating furnace may be similar, except for size, to that described for reheating ahead of the plug mill. The expanding or rotary mill, illustrated by No. 13 of the diagram, functions much like the piercing mills. Because of the larger diameter, greater expansion required and much thinner walls generally produced, this mill must be classed as a precision unit.

(To be continued)

Heat Transfer Book Published

DEVOTED mainly to the fundamentals of heat transfer, is the first of two volumes offered by Dr. M. Jakob, research professor of mechanical engineering at the Illinois Institute of Technology. Entitled *Heat Transfer*, it is a treatise for research workers and a textbook for graduate and intermediate teaching. It is being published by John Wiley & Sons, New York.

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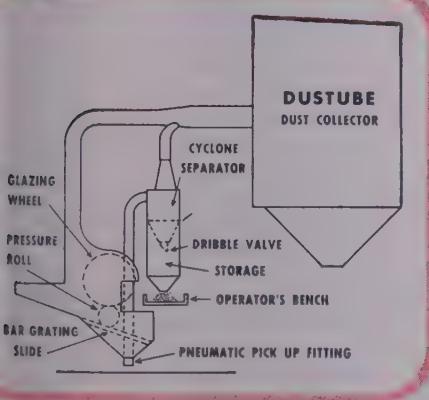
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DESPITE strike-bound iron and steel plants the annual convention of the Association of Iron and Steel Engineers, William Penn hotel, Pittsburgh, Oct. 3-6, closed with an attendance just slightly above that of two years ago which was a no-show the same as this year. A report of the business session, including the new officers of the association, Kelly award recipients, next year's meeting location and other details, was presented in STEEL, Oct 10, page 90.

A digest of some of the papers delivered at this year's meeting follows:

In his paper, "Construction and Maintenance of Open-Hearth Furnace Bottoms", C. W. Conn, Steel Division, Ford Motor Co., Detroit, mentioned that a good percentage of bottom and bank trouble is created by the human element. While there is room for improvement in the chemical composition and physical characteristics of basic open-hearth bank and bottom construction and repair refractories, we have not gained all of possible efficiency from present units.

If all first helpers today had on-the-job and classroom training as concerns furnace construction, composition and use of refractory materials, chemistry and metallurgy of steel-making, fuel and alloying elements, we could be assured by all reasonable means that we had qualified men to run our furnaces.

Another Art—Steelmaking is an art in every sense and we should stop treating the training of personnel in such a hit or miss fashion. First helpers who had served their apprenticeship and were graduated journeymen, again could travel from shop to shop as of old, adding to their experience and knowledge. It would minimize, if not eliminate, many problems existing in our industry with labor, provide a sound basis for training and evaluating our personnel, accomplish more tons per hour, less fuel per ton, and greatly decrease bottom and bank trouble.

R. Tietig, Jr., A. J. Boynton & Co., Chicago, in his paper entitled "Increased Open-Hearth Production by Improved Charging Methods", states that to many observers the conventional method of charging open-hearth furnaces is not an efficient operation. In most instances,

Informative data on personnel training, checker brick, maintenance, conveyor systems, controlled cooling of semifinished steel, painting of mill buildings, material handling, bearings and seals, coal and ore bridges, etc. are widely discussed at recent annual meeting of the Association of Iron and Steel Engineers

the defects are easily recognized. For example, the simultaneous charging of scrap in adjacent furnaces frequently results in charging delays or a greater number of furnaces may require hot metal at any one time than there are cranes available for its delivery.

Too Many Problems—Solution of these and other problems would require an entirely new arrangement of an open-hearth plant which in turn may present other undesirable conditions of ever greater magnitude than those currently existing. An idea of this may be found in the frequent suggestion that a furnace equipped with a removable roof or front wall could be charged in a single operation without interfering with an adjacent furnace. It should be noted, however, that such a method of charging applied to heats being made by the flush slag practice would probably result in an extremely long heat time because of the difficulty of heating the ore and lime stone in the bottom of the charge.

Much of the hot blast stove development has come about with the use of better cleaned blast furnace gas and improved stove efficiency. This fact was brought out in a paper on "Checker Brick Design, Construction, and Use" by J. J. Seaver, J. J. Seaver Engineers, Chicago. Old

stoves used from 35 to 50 per cent the gas produced to heat the check to give an air temperature of 1 to 1100° F, with a chimney temperature ranging from 700 to 800°. The same size stoves, the speaker pointed out, with improved check and increased wind volume, are able to carry 1600° F straight-line heat with a 350° chimney temperature a consumption of only 20 per cent the gas produced; or stove efficiency ranging from 80 to 90 per cent possible with present day designs.

One Shape—Speaker believes that checker brick for each set of regenerators should be limited to one shape. This will reduce manufacturing laying costs, and inventory stage space. He warned that checker brick should not be oversize in much as an accumulation in of each brick not only gets the checkers out of alignment but causes extensive cutting at the walls.

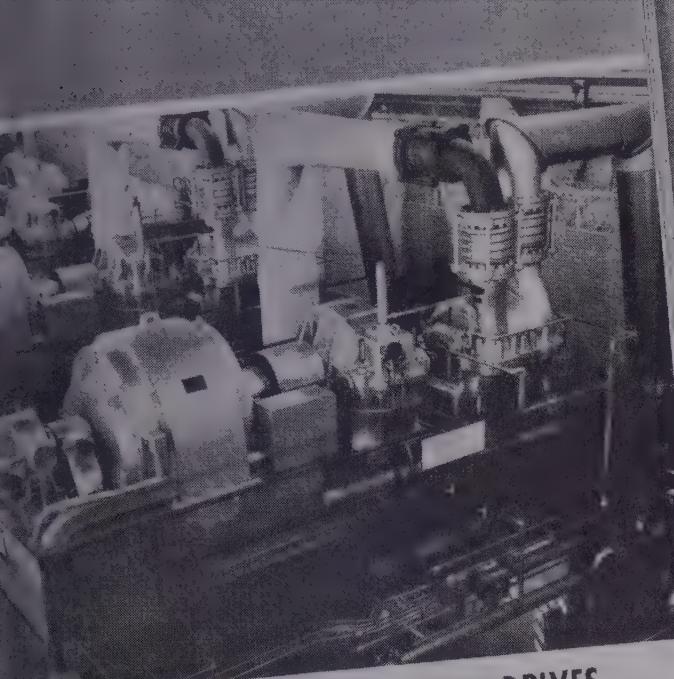
Recent tests, made on checker brick approximating open-hearth heating and reversal conditions, show that the outer $\frac{1}{2}$ -inch of the vertical surface of the brick absorbs $\frac{2}{3}$ of the heat taken up or given off by checker brick, and that the first inch absorbs 90 per cent of the total heat exchanged.

Tests show that the open-hearth brick walls should not be thicker than $2\frac{1}{2}$ inches to meet all requirements especially if they are locked in place.

That maintenance is of prime importance to a smooth-running, top-producing steel mill was advanced by S. D. Baumer, manager, Technical Sales Division, Air Reduction Sales Co., New York, in his paper on "Steel Plant Maintenance". The author pointed out that many repairs centered around either welded applications or weld-deposited new metal.

It is in such operations that availability of the correct equipment, electrodes and supplies, the correct personnel and the functioning of the notch supervision becomes of great importance. Supervisors must have reliability, capable operators to carry out the work according to specifications for each different job; operators must have the necessary equipment and supplies. With it, results, costs, and efficiency will all be highly gratifying.

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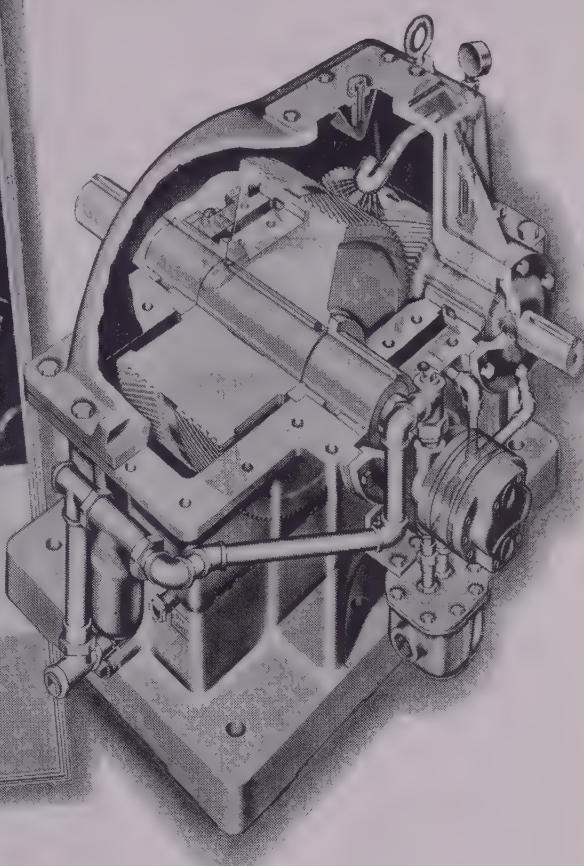


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Enclosed Gear Drive Section—Gearing Division
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Presented at the 1948 Semi-Annual Meeting
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Westinghouse



Mr. Baumer pointed out that the same principles underlie the success of all phases of steel mill maintenance. Fundamentally, he said, they can be summed up as the application of production thinking and production standards to maintenance work.

The next few years, the author believes, will see the introduction of still more new techniques and facilities, still further improvements in methods, and steadily increasing know-how among maintenance men.

Yield is increased by conveyor systems capable of handling large tonnages of heavy coils dependably, yet gently enough to reduce damage and scrap losses to a minimum. This was brought out in a paper entitled "Developments in Coil Conveyor Equipment Design" by L. O. Millard, Link Belt Co.

Widespread Savings — Chain conveyors are effecting economies in various processes, from the hot mill to the shipping platform, in the author's opinion.

The car-type conveyor is an ideal unit for cooling hot coils on end, for its beam tops combine broad bearing surfaces with ample space between for circulation of air. The coil remains on its own car from loading to unloading zones, without transfer regardless of path of travel, thus reducing the possibility of coil damage to a minimum.

While coil conveyors improve efficiency in performing their primary functions of economical and safe transportation, they offer additional returns in the form of increased yield, by handling coils with less damage than other methods.

The most important advance in transfer design would be a conveyor system which eliminated all transfers. The car type accomplishes this objective within the limits of its own travel. Another step in this direction was made by the application of the booster drive to coil conveyors.

The author also mentioned that drive units have been further improved by the use of fluid couplings to cushion mechanical parts against shock loads, to limit overload stresses, and to eliminate the necessity for high starting current.

In the paper "Controlled Cooling of Steel Blooms in Car Bottom Furnaces" by S. J. F. Burch, supervisor design, open hearth and electric furnaces, Carnegie-Illinois Steel Corp., Duquesne, Pa., it was brought out that slow cooling is the common flake prevention treatment. The speaker stated that if some types of high-carbon or alloy steel blooms or billets are permitted to air cool to atmo-

spheric temperature after they are rolled, fine cracks, generally described as flaking, will develop throughout the center portion of the piece which may render the steel unfit for its intended use. He advocated a heat treatment involving slow cooling of the hot-rolled product to control flaking.

Cooling Time — This may take 8 to 12 days depending upon the size of the bloom. This is a time consuming feature and is a matter of much dissatisfaction from a production and delivery standpoint. On the other hand, the use of fired pits or furnaces for the cooling process presents a positive solution to the flaking problem and is referred to as "controlled cooling". It is a cycle treatment and produces the most desirable structure for further processing. Uniform quality of the product eliminates excessive testing and hence, permits early scheduling of the secondary mills, thus reducing delays. Conditioning time and costs are reduced and chipping is possible where grinding would frequently be necessary. Reduction in cooling time by as much as 75 per cent expedites delivery of the finished product.

In speaking of the car bottom furnace, the author pointed out that the initial cost of this type furnace is estimated to be 25 to 30 per cent higher than the bell-type furnace and approximately 15 per cent higher than the pit type furnace. He explained, however, that the maintenance of the car bottom furnace is estimated to be about $\frac{1}{4}$ that required for the bell type and pit furnaces.

Advantages and disadvantages between the straight-away continuous mill as compared with a 14-inch semicontinuous cross-country mill were presented by L. C. Sowell, superintendent of blooming and rolling mills, Aliquippa Works, Jones & Laughlin Steel Corp., in his paper on "Continuous Merchant Mills." With the cross-country mill a check of sections can be made more easily between stands, whereas in the straight-away continuous mill it is necessary to throw out cobbles which is costly in time and material. The cross-country mill also has a distinct advantage in that temperature and finishing conditions can be more readily controlled.

As to the rolling rate and the overall cost, the author believes with bottlenecks eliminated that the straight-away continuous mill will have a distinct advantage. Once this type mill is set up on a section, it becomes a matter of close attention and watching of bar travel and checking of section; the remainder is merely routine. He also mentioned that

theoretically the continuous mill is subject to more cobbles and a slight increase in steel loss over the cross-country mill. Actually, he explained, it requires a straighter and truer livery from span to span. Maintenance and utility costs, which are vital to all operating units, appear to be about equal.

W. W. Scherer, division superintendent of maintenance, Carnegie-Illinois Steel Corp., Homestead Works, Pittsburgh, in his paper entitled, "Problems of Mill Building and Equipment Painting", states that undoubtedly the most important single consideration is the continued maintenance of adequate surface protection of building and other exposed structures.

Rapid Corrosion — The proximity of gaseous products of combustion at normal temperatures and a variety of other influences, leads to an accelerated rate of corrosion. Due to which such influences may affect the life of the metal coating, for example, is well illustrated by an authoritative estimate of the life of a galvanized coating of 2 ounces per square foot of various atmospheres. It is estimated that such a coating will last approximately 150 years in certain dry tropical locations, 25 years in rural England, 5 years in urban England, and one year in an English railway tunnel.

Influences to which paint films are exposed frequently vary from time to time and may not be well defined; consequently, laboratory tests have limited value in determining the most effective methods and materials.

At an average steel plant about 40 per cent of all labor on the rolling mill is involved directly or indirectly in the handling of materials. This fact was brought out by L. R. Aspinwall, Jones & Laughlin Steel Corp., Pittsburgh, in speaking on "Material Handling in Steel Plants". He pointed out that about 1/3 of the total cost of production in the steel plant is involved in materials handling. Safety authorities find that about 70 per cent of all personal injuries in a steel plant are due to some phase of materials handling.

Radical Changes Not Needed — simple mechanization, materials handling operations have been simplified; the flow of material has been increased in volume, production more uniform, worker fatigue minimized, personal injuries materially reduced, productivity per manhour increased and production costs generally reduced or kept in line in the face of increasing prices.

With increasing complexities of operating conditions, it has become necessary that we have specialized men to direct our thinking and assist

ng answers for the endless number of problems that arise in every one of our plant operations.

T. Lewis, Republic Steel Corp., in his paper on "Bearing Inspection and Repair" pointed out that the basic requirement for bearing inspection and repair is the proper and the necessary facilities for handling the bearing parts through steps of inspection and repair. The second requirement is that the shop should be in connection with or adjacent to the necessary machine services that may be required to carry out machine work in connection with the needed repairs. He recommended that the facilities in bearing shop should include a face table, a cleaning tank or degreaser, a crane or hoisting equipment, tools including grinders and burners, and provision for parts storage.

He stressed the importance of a definite service period for given bearings as being the interval between inspection. If the inspections are made too close together, the cost of overshadow the savings gained if the periods are of too long a time the bearings may be too far gone to make satisfactory repairs. By moving the load zone of the bearing through 90° rotation at each inspection, the time of complete failure can be pushed further into the future. If the bearing is turned end for end at the completion of each 360° rotation, the life of the bearing can again be prolonged to some extent.

J. W. Fisher, Garlock Packing Co., Binghamton, N. Y., in his paper entitled "Considerations in the Development of Rolled Neck Oil Seals", states that advances in the production of high-speed mills, have brought new power, lubrication, bearing and sealing problems. Functioning of the bearing largely governs the life of the bearing and the amount of makeup necessary. For the past 15 years more and more attention has been directed toward the improvement of this oil

Synthetic Rubber — Improvement came with synthetic rubber of the corrugated type commonly known as Buna. Direct saturation was less than in the original for the new material was softer and cross hatching for cross section more flexible, resulting in overheating, burning and more leakage. Next was the Buna-N type synthetic. Here was an improvement over the corrugated type. It has no affinity for steel so did not require such treatment of the steel facing which only wicked the oil past the lip. Nor did it decompose at high temperatures to yield corrosive

by-products. But unfortunately it did become hard and almost as fast as the corrugated type. Good bearings do not wear out very fast. Oil seals functioning reasonably well do not wear out fast. This was a good and true statement of fact then and also today.

From considerations presented, there has developed the thought that flexible seals making spring loaded contact normal to a cylindrical shaft, presents the most satisfactory answer for roll neck seals.

J. A. Toth, Torrington Co., Bantam Bearings Division, South Bend, Ind., in his paper entitled "Relationship of Preventative Maintenance and Roller Bearing Application", states that it is possible to develop bearings of types and sizes to meet any condition of load, but in most cases, the limiting factor is introduced by the initial cost and the massiveness of the equipment.

Experience has definitely proved that oil lubrication will prevent excessive neck wear and scoring. Consideration should be given to use of lubricants with low viscosity to allow flow to bearing bore, but at the same time, it is necessary to establish the lubricant viscosity to prevent leakage through the seals. Seasonable temperature variations introduce a requirement for change of viscosity of lubricant and this is more or less standard mill practice at the present time. A direct relationship can be established between service life results secured with bearings in slow speed stands and bearings in higher speed stands near the end of the finishing train. A similar relationship can be established for load conditions in different stands. For each stand on cold and hot mills, it has been suggested that a factor be applied that would encompass speed, load and time underload.

Lubrication Program — A lubrication program might be considered to include personnel familiar with the equipment and also a lubrication engineer representing the lubricant supplier. Lubricant manufacturers have developed charts covering the specifications for lubricants used in the automobile; consequently, there should be no objection to developing similar charts for equipment in the steel mill plant. Such a program may reduce the number of types of lubricants needed for central storage and control.

E. W. Head, sales manager, Control Corp., Minneapolis, in his paper entitled "Supervisory Control and Telemetering As Cost Reduction Tools", stated that most electric utilities have active systems of supervisory control and telemetering in service, or are

laying plans to adopt these in their operation. True economic advantages result from the use of this type equipment, such as lower operating costs and improved operating efficiency. Such equipment will allow one operator at a central point, to control, supervise and meter equipment in processes, at one or more remote points. Savings that result in this case are in the form of wages of operators that would normally be used to man the remote points and these savings over a year or two will usually buy enough supervisory control and telemeter equipment to allow these operators to be eliminated.

As supervisory control and telemetering are cost production tools, it can be used to control any remote equipment that is subject to control by closing an electrical contact. While supervisory control and telemetering do not constitute a cure all for all high-cost operations, they do have a definite place in the field of cost reduction.

H. E. Larson, Steel Mill Division, Industrial Engineering Division, and T. Dunnegan, Jr., Control Systems Division, General Engineering and Consulting Laboratory, General Electric Co., Schenectady, N. Y., in their paper entitled "A Static Magnetic Amplifier for Regulating Circuits" and known as an "amplistat" pointed out that when the device is properly applied and integrated into a regulating system, it becomes the motivating factor that monitors the entire regulating system. It does so by sensing small signals, amplifying them greatly and quickly imparting the amplified commands to the system with decisiveness and stability so that the system can properly adjust itself to the desired standard.

This device requires no periodic maintenance because it is a static device with no moving parts or electronic tubes. The amplistat is not expected to revolutionize the iron and steel industry, but it will prove useful in many applications.

B. A. Rose, director of engineering, Heyl & Patterson Inc., Pittsburgh, in his paper on "Recent Developments in the Design of Coal and Ore Bridges" presented data to show that the simple 2-motored hoist with totally enclosed gears should have preference in any bridge application. A new design of turn table has been devised so that the advantages of this hoist can be retained in those applications where the bucket must be rotated in its operation. The speaker recommended simplification of the cumbersome spring suspension and cradle-type trolley drive. The proposal is to use a frame mounted motor with a totally enclosed axle hung gear

case and a rubber mounted axle suspension scheme.

Variable voltage control scheme, he stated, has definite advantages which make its use justified on new bridge installations. Use of welding provides a structure which is more readily cleaned and protected from corrosion.

Otto Jensen, manager Rectifier Division, I-T-E Circuit Breaker Co., Philadelphia, in his paper entitled "The Mechanical Rectifier" states that advantages of this device include its inherent high efficiency in its voltage range, small space requirement, and low installation cost, due to completely factory-wired units. The major item requiring replacement is the contacts which have an expectant contact life of 18 months and which can be replaced in 10 minutes for a 5000 hp machine. Life of mechanism bearings is better than 50,000 hours and a complete reset of bearings can be installed in 12 hours at a cost of less than \$100.

Limitations of the mechanical rectifier are its relative low-power factor (86-90 per cent) and tendency to backfire by overloading beyond its guaranteed overload capacity and by interruption or loss of 60 per cent of ac voltage. In both cases, the contact mechanism is protected against severe damage by short-circulating both the ac and dc sides of the mechanism by a ultra-high speed (0.001-second) device which operates whenever the ac input does not balance the dc input. After the short-circuiting device operates, the dc brake is switched due to reverse current and the ac brake is switched due to overload. Short circuit stresses on the ac side are moderate because the commutating reactors are left in the circuit. They still produce the step and the short-circuit current is therefore only approximately half of the value it would assume if the reactors were not in the circuit. Due to the step, the interrupting duty of the ac breaker is materially reduced. Net damage to the mechanism whenever a backfire occurs, is that one or at most two contacts are burned and they should be replaced at the first opportunity.

Records 1 Hour Continuously

EXECUTIVE meetings, conversations and instructions may be recorded on the sound reel magnetic tape recorder introduced by Mark Simpson Mfg. Co. of Long Island City, N. Y. One hour of continuous recording may be made on the 1200-foot reel of tape which may be used up to 5000 times. Same recording may be played back many times.

LETTERS to the Editors...

Concerning Four-Wheel Drive

Mostly, personally, I take STEEL for the excellent page, "Mirrors of Motordom", by A. H. Allen. I have noted the news article on four-wheel drive passenger cars on page 46 of the August 22nd issue of STEEL, and let me state the following as a matter of information and, I believe, true fact:

Reference your article says, "First production-line passenger car with four-wheel drive is now being built by Willys-Overland Motors, Toledo, O." The fact of the matter is that the first four-wheel drive passenger cars that were built and in quantities were made by Marmon-Herrington of Indianapolis, Ind. Marmon-Herrington built their own axles, engineered and manufactured these for wide distribution. Much of their bus work has been export. Many of them were used for war purposes even before World War II. We know because we built "tropical" radiators for them to take up to 130° temperature for desert transportation but these were not special, they were standard products which Marmon-Herrington made. I thought this might be of interest to you.

You might tell me these are conversions of Ford cars, but close relationship between Ford Motor and Marmon-Herrington has always been available, much as other companies use axle grouping or assemblies here and there.

F. M. Young, President
Young Radiator Co.
Racine, Wisc.

Society's Address

We note in your August 15 issue a paragraph mentioning that the National Society for Prevention of Blindness had published a manual of toxic eye hazards. Can you give us the society's mailing address?

R. W. Schlumpf, Chief Metallurgist
Hughes Tool Co.
Houston, Tex.

Society address is 1790 Broadway, New York
19, N. Y.—The Editors

Our Author Corrected

We wish to call your attention to an article in the August 8 issue of STEEL, "What's Left of Japan's Iron and Steel Industry?", credited to Mr. J. Z. Reday, president, International Engineers Inc., New York.

This article begins on p. 68 and includes a box reading as follows: "For

nearly 3 years, Mr. Reday served as chief of the Industrial Division of General MacArthur's Staff. Since June, 1948, he has been engaged in trading and engineering work in Japan, and holds the only post-consulting engineering license in the country."

This statement is entirely inaccurate. A check of license records maintained in General Headquarters shows a total of nine such licenses. This total includes our license.

We have on our staff highly qualified and thoroughly experienced American licensed (professionally) metallurgical, chemical, electrical and mechanical engineers. We are active in the metallurgical field and have advertised both locally and internationally.

Porter D. Dilley,
Manager, Japan Branch
Traders Service Co., Inc.
Tokyo, Japan

Statement referred to is not "entirely accurate". In light of evidence, Mr. Dilley entirely justified in questioning that point concerning the postwar license. We are sorry to stand corrected.—The Editors

Being Forwarded

We would appreciate your sending us extra copies of the article "Cold Shaping Steel" which appears in the issue beginning July 25, 1949.

M. N. Holmes
Purchasing Agent
North & Judd Mfg. Co.
New Britain, Conn.

Article referred to appeared as two parts in the July 25 and August 1 issues.—The Editors

Comparing Steel Production

The writer had occasion to listen to a talk by a college professor who stated that the European countries including Germany had made such a comeback that they were now producing more steel than before the war. This sounded a little farfetched so we would ask if you happen to have any reliable data on the subject.

L. E. Collins, President
Medina Stamping & Machine Co., Inc.
Medina, N. Y.

According to figures published in STEEL Yearbook issues (Jan. 3, 1938, p. 290 and Jan. 3, 1949, p. 298), the production of ingots and castings was, in 1937, 68,650,000 net tons, and in 1947, 57,032,000 net tons. These figures include tonnages for Great Britain (10,615,000 and 14,246,000 net tons, respectively) and for Russia (15,164,000 and 800,000 net tons, respectively). These figures would make the professor wrong. However, he used 1934 figures, for instance, steel and casting production was 43,252,000 net tons including 7,894,000 net tons for Great Britain and 8,396,000 for Russia. All figures in continental Europe are included.—The Editors

New Products and Equipment

Fast-Timed Stud Welder

Principle of the single gun stud welder made by Graham Mfg. Corp., 1 E. Eight Mile Rd., Ferndale 20, Mich., is a capacitor-operated, self-ignited device using tip studs which, coming in contact with the work being fused, causes ionization. This



turn allows a path for the main charge current of the capacitor to form an arc sufficient to melt both the full diameter of the stud end and work piece directly under it. Following this is the hammer blow causing the pieces to weld. Time of the weld is about 1 mil second, which makes possible use of very high currents.

Advantages from short arc time include concentration of heat, welding of studs on very thin metal, no distortion of work or discernible heat, and possible welding of dissimilar metals. Stud dimensions may be up to $\frac{1}{2}$ -inch and welding pressure may be either mechanical or pneumatic. Overall cabinet dimensions are 16 x $\frac{1}{2}$ x 38 $\frac{1}{2}$ inches.

Check No. 1 on Reply Card for more Details

Dip Tank Is Automatic

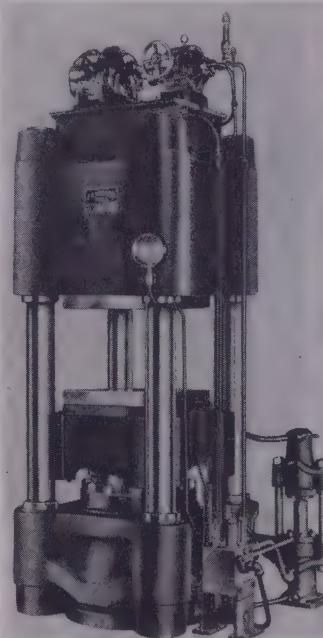
Manual labor is eliminated in the operation of the Dip-O-Matic dip tank for cleaning of metal parts, designed by Hopkins Equipment Co., 40 Maple St., Hatfield, Pa. A three-way fine-tipped control air valve automatically lowers and raises specially designed basket into the cleaning solution. Floor space required is 2 x 3 ft.

Metal cleaning action is twofold: shaking action helps loosen dirt and grease and agitated solution action washes parts. Steam heat maintains

cleaning solvent at proper temperature, or cold solutions may be used. Check No. 2 on Reply Card for more Details

Hobbing Press Has Two Ranges

Accurate hobbing of intricate single and multicavity molds may be accurately carried out with the 1000-ton upmoving HydroLectric press developed by R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Pa. The hydraulic press offers a platen work-



ing surface measuring 24 by 30 inches, made of ribbed box section cast steel.

Working pressure of 3000 psi is supplied to the ram by a rotary piston-type pump with a 4 $\frac{1}{2}$ gallons per minute displacement at this pressure. By use of a hydraulic intensifier, a high pressure of 6350 psi can be achieved. Press is controlled through a lever-operated 4-way operating valve. Protective devices, hydraulic pressure gage, wiring and all necessary valves and control equipment are supplied with the unit.

Check No. 3 on Reply Card for more Details

Smoke Detector Protection

Four spaces may be protected simultaneously by a smoke detector developed by Walter Kidde & Co., 40 E. 34th St., New York 16, N. Y. Two main units of the detector are the control cabinet and analyzer tube. In each protected area, one or more accumulators are installed at the ceiling, connected by rigid piping to control cabinet.

Analyzer tube, mounted near the control cabinet, is connected to it electrically and by piping. All accumulators in all spaces are under constant suction, drawing continuous streams of sampling air to the control cabinet. Air from each space is sampled for 10 seconds in succession. If 3 per cent or more smoke is present in any air sample, the valving mechanism stops and the fire alarm rings. A numbered wheel indicates the space from which the alarm originates.

Check No. 4 on Reply Card for more Details

Switch Directs Conveyor Flow

Flow of material from one single conveyor line to two lines, parallel or converging, at 45 degree angles either right or left is possible with the Y switch offered by Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y. Center section is locked in posi-



tion. Switch is available with wheels or rollers. A 90 degree turn, right or left, may be accomplished with the addition of 45 degree curves. Both wheel and roller types are available for use with 12, 14, 18 and 24-inch conveyors.

Check No. 5 on Reply Card for more Details

Table Lifts 750 Pound Loads

Montgomery & Co. Inc., 53 Park Place, New York 7, N. Y., is offering a hydraulic elevating table which enables one man to carry or lift 750 pounds. Constructed of steel, the table is portable, but can remain fixed in any position. The hydraulic jack which raises it $\frac{1}{4}$ -inch per stroke can be removed.

Use can be for transferring of dies, moving of heavy work from horizontal mills to drill presses or for supporting and leveling large over-

hanging pieces of work. Maximum and minimum floor to table heights are 42 and 27 inches, respectively. Top of the table measures 19 x 28 inches.

Check No. 6 on Reply Card for more Details

Cuts Washing, Pickling Time

Pickling time is cut to less than one-third in a completely enclosed washing and pickling machine developed by R. C. Mahon Co., Detroit, Mich. A Hydro-Hermetic seal incorporated in the spray pickling equipment protects the continuous overhead monorail conveyor and prevents

the escape of spray or fumes. Used for the preparation of metal surfaces to receive porcelain enamel, the process is continuous through all operations: Emulsion cleaning, clear water rinse, alkali cleaning, three-stage water rinse, sulphuric acid bath, acid water rinse, nickel sulphate bath, sodium cyanide neutralizer, borax neutralizer rinse and hot air dry-off.

Tanks and tunnel housing are of mild steel except in areas where corrosive materials are in contact or fumes prevalent. Here steel is lined with lead, rubber or Monel metal. The seal also prevents loss of active

chemical fumes, reduces ventilation requirements to a minimum and eliminates the necessity for replacement of air within the building. Pickling machines are designed to meet any requirement of processing, production rate, or plant layout.

Check No. 7 on Reply Card for more Details

Stop Collets and Stops

Available from stock are stoplets and stops for Brown & Sharpe automatics and wire feed machines made by Hardinge Brothers Inc., Niagara, N. Y. With the standard unit, the operator or setup man

**FIVE YEARS SERVICE
WITH MINIMUM
REPAIRS TO WALLS
AND ARCHES!**

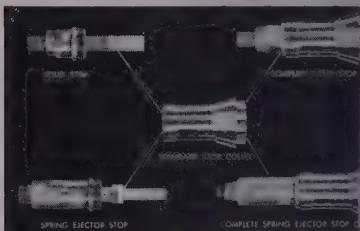
BUCKEYE SILICA FIRESTONE

• Buckeye Silica Firestone holds heat longer—provides greater savings in fuel! It has greater than usual strength to resist abrasion—saves repair costs! Its corrosive resistance guards against chemical attacks of slag—makes it last longer!

Other important features make Buckeye Silica Firestone ideal for the solution of your soaking pit problems. Write us for full information.

THE CLEVELAND QUARRIES COMPANY
1740 E. 12th St., Cleveland 14, Ohio

Bulletin 15-B is free. Send for it!

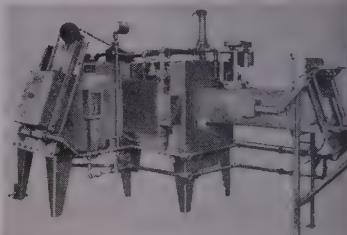


easily apply either a solid stop or a spring ejector stop to a standard stop collet. They are treated for correct application of either the spring ejector or solid stop. A variety of types and sizes are available.

Check No. 8 on Reply Card for more Details

Finish for Bright Annealing

Molybdenum, 18-4-1, 18-4-2 or balt type high speed steels can be hardened virtually bright and free from decarburization or carburization in the L-type atmosphere hardening furnace developed by Lindberg Engineering Co., 2444 West Hubbard, Chicago 12, Ill. Unit consists of



preheat, high heat and quench built into one complete unit. The heat is built at a right angle to the high heat and the quench unit follows.

Quench unit is designed to quench steel by means of forced convection cooling, protective atmosphere. Sections of high speed steel up to 12 inches can be fully hardened by atmosphere quench. The protective atmosphere used is generated by a separate atmosphere generator. Endothermic atmosphere generated from city, natural gas or propane.

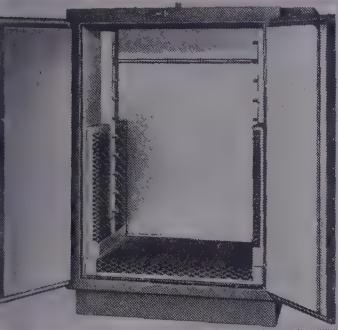
BUCKEYE
"FOR THAT EXTRA SERVICE"
SILICA FIRESTONE

propane, or butane gases or the co atmosphere generated from charcoal can be used.

Check No. 9 on Reply Card for more Details

en Controls Temperatures

Developed to provide the accurately controlled temperatures necessary for heating and curing of plating and coatings is the electric oven offered by Belke Mfg. Co., 947 N. Heron Ave., Chicago 51, Ill. Ovens are designed to provide controlled heating for other uses in various types of plants



laboratories. Temperature is maintained at any preset temperature between 300 and 400° F by automatic control. Other ranges can be furnished.

Ovens are insulated with 3 inches of glass wool. Nichrome 5 heating elements are easily replaceable, being mounted on the bottom and side walls for uniform heating. Construction is of sheet metal and angle iron. Units are wired and ready for connection to most electrical service outlets. Ovens are available in three standard sizes or made to specification.

Check No. 10 on Reply Card for more Details

Under Handles 220-Inch Knife

Measuring 28 feet in length, a heavy-duty straight knife grinder, produced by S. C. Rogers & Co., 191 Clinton Ave., Buffalo 11, N. Y., ac-



ately handles any heavy chipper knife, shear blade, paper cutting knife and doctor blade up to 220 inches in length. A 15 hp motor drives the 20-inch segmental grind-



"Duck, Plunkett...OVERHEAD!"

Oops! Sorry! You can't duck overhead any more than you can evade taxes. But you can do something about lifting it a bit... to give you headroom. And here's how!

★ ★ ★

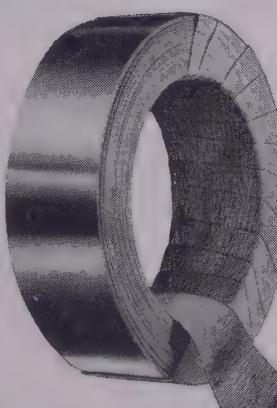
It's done by cutting away dead wood—unprofitable process steps that can be eliminated, unproductive floor space that can be turned into a revenue producer, and personnel that can be shifted from non-profit operations. Accomplish all three and your overhead will lift automatically, letting welcome profit sunshine in.

Easier said than done?... Not if you know about *pre-coated* Thomas Strip—one of the most effective overhead-lifters that ever happened. *Pre-coated* in copper, brass, nickel, chrome, zinc, tin or lacquer, it makes possible the streamlining of your process to its two profitable essentials—fabrication and assembly. Preparation, cleaning and buffing, and plating... all three bothersome steps can be eliminated. And in addition, *pre-coated* Thomas Strip fabricates easily and with uniformly high quality.

Discover the overhead-reducing power of *pre-coated* Thomas Strip for yourself—in your own shop and process. We will be glad to study your requirements and suggest the analysis of Thomas Strip best suited to your product and process. A trial run will carry its own convincing proof. Write today or call:

THE THOMAS STEEL COMPANY
WARREN, OHIO

Specialists in Cold Rolled Strip Steel



Electrocoated with Chromium, Nickel, Copper, Zinc and Brass • Hot Dipped Tin and Lead Alloy • Lacquer Coated in Colors • Annealed and Tempered Spring Steel • Alloy Strip Steel • Uncoated Strip Steel • Produced to Your Specifications.



ing wheel and a 3 hp motor guides the traverse carriage.

Five-inch V-ways in base and carriage absorb grinding pressures and permit heavy cuts and fast feeds. A jaw clutch transmission starts the table smoothly and moves it steadily. The model 220 machine is also available in 100, 110, 134 and 238-inch lengths.

Check No. 11 on Reply Card for more Details

Resistance Welder Slope Control

Designed to provide a refinement of a gradual increase in welding current at the beginning of the weld,

a new slope control for use as an accessory with either synchronous or nonsynchronous resistance welding machines as offered by General Electric Co., Schenectady 5, N. Y. It materially reduces tip pickup in spot welding aluminum, magnesium and their various alloys.

Accessory control is furnished in two types: For mounting in the side of synchronous controls; the other in a separate enclosure for use with older types of controlled nonsynchronous control. Setting of one of two dials, which is graduated from 3 to 13 cycles, determines the time for

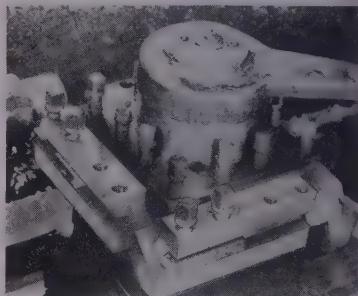
the welding current to reach a fixed value from its initially low value. Other dial permits adjustment of initial value of the welding current. A transfer switch disconnects the slope control for those operations which it is not needed.

Check No. 12 on Reply Card for more Details

Tool Holder Cuts Setup Time

A tool holder which allows standardization on one size tool and which cuts setup time, thereby speeding production, is offered by Rusnak Tool Works, 4840 W. North Ave., Chicago 39, Ill. Holder will allow turning two diameters or facing two shoulders with one pass. Large cuts may be made with small tools.

Made of hardened steel, its construction makes it possible to use



inch tools on jobs that would normally require larger tools. After correct height is obtained with the tool holder by the use of the rod arm of the tool post, the tool can be removed from the holder for grinding and replaced without disturbing setup. A tool can be used from either end of the holder.

Check No. 13 on Reply Card for more Details

Lathe Collet Speeds Output

Output of the 10-inch precision manufacturing lathe and the Specialmatic hand-operated screw machine may be increased by an air-operated



collet attachment, developed by Monarch Machine Tool Co., Sicamous, O. Design permits use of a feed attachment. Two pushbutton controls in the headstock of the machine control the attachment, one opening the other closing.

The Vice-President says:

**"If it's an
R.D. Wood
... it's good!"**



"As a company executive, I must see that our plant equipment shows a measurable investment profit. We depend on R.D. Wood hydraulic presses. We know the quality that's built into them."

Write for information and data sheets on hydraulic presses, or consult us without obligation on any hydraulic problem.

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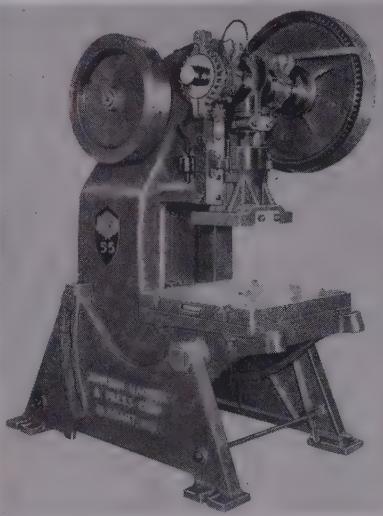
LG-3

Applied quickly to the camlock spindle nose of either lathe, the collet adapter takes standard collet and accommodates sizes handling from $\frac{1}{8}$ to 1-inch round stock. The new attachment is available only for factory application to these two lathes.

Check No. 14 on Reply Card for more Details

Wide Range Inclinable Press

Featuring a 32 x 34-inch bolster plate, a 14 x 18-inch ram face and a large die space with 14-inch standard to 18-inch maximum opening, the model 55 inclinable press announced by Johnson Machine & Press Corp., Elkhart, Ind., has a 20-inch opening



through the back. An interchangeable thin steel bolster is available to provide still greater die space without sacrificing strength.

The 56-ton press will handle work up to 16 $\frac{1}{4}$ inches deep at 45 pieces per minute either in the vertical or tilted positions up to 36 degrees. A tripping device protects the operator in the event of spring breakage. Press frame is cast semisteel and all points of greater stress are heat treated. Friction type brake may be easily adjusted by turning a small knob.

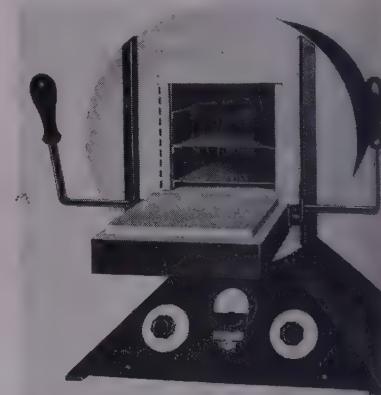
Check No. 15 on Reply Card for more Details

Rapid Heating Muffle Furnace

Tempering or drawing of tool and die steels is the primary application of the air draw muffle furnace offered by Hevi Duty Electric Co., Milwaukee 1, Wis., although it may be used for practically any heating operation requiring temperatures to 1250° F. A high speed direct-connected centrifugal fan is located at the rear of the chamber with its shaft extending through the rear wall to the drive motor. A heat-resistant

alloy baffle is provided to direct the flow of air from the fan through narrow passage between the heating elements and the baffle, then into the work chamber and back to the fan intake.

High speed air circulation throughout the furnace chamber results



rapid and uniform heating of the work. Adjustable shelves are provided for locating the work at different levels.

Check No. 16 on Reply Card for more Details

Gaging Machine Speeds Output

Automotive connecting rods may be gaged, classified and segregated automatically by the Airlectric machine developed by Sheffield Corp., Day



1, O. The machine makes the task of checking critical dimensions easier, increases manpower productivity and enables checking on a mass production basis.

Rods are gaged completely for critical dimensions and conditions stamped with proper classification and suitably segregated at the rate of one every 5 seconds. Dimensions and conditions checked include total diameter, average diameter, outside diameter, taper, squareness of face width, bore, center distance between holes, width, bend and twist. The operator loads the rods on eight con-

y rotating indexing platforms. The machine is built to withstand continuous operation.

See No. 17 on Reply Card for more Details

Hook for Vertical Stacking

Increasing of rod or wire warehouse storage capacity is possible with a vertical stacking hairpin hook carrier developed by Cleveland Crane and Hoist Division, Cleveland Crane



Engineering Co., Wickliffe, O. Unit can handle 10 coils of 330 pounds each at one time, picking them up in a horizontal position and placing them in vertical piles supported by floor posts. The reverse operation also may be performed.

Grab mechanism is activated by a built-in hydraulic pump which causes spreader plate to expand or retract. All motions of the hook are controlled from crane operator's cab.

See No. 18 on Reply Card for more Details

High Speed Cutoff Machine

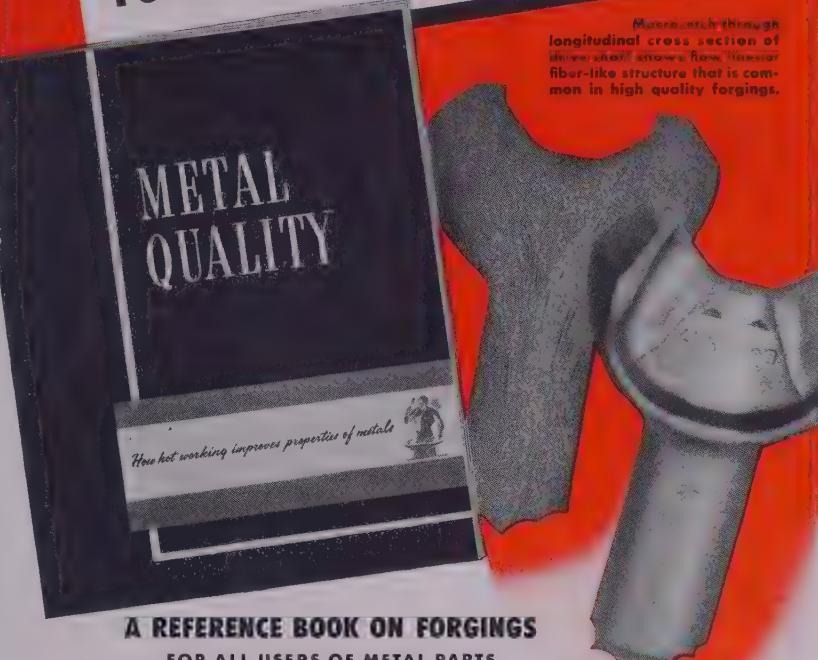
An abrasive metal cutoff machine, made by Stone Machinery Co. Inc., 120 Fayette St., Manlius, N. Y., cuts to 3-inch solids and 4-inch pipe



both ferrous and nonferrous materials. Featuring a 5 hp geared-in-line motor drive and a self-centering vice adaptable to most contours and shapes, the "swing-cut" machine

**THE METAL QUALITY FOUND
IN FORGINGS PROVIDES
MATCHLESS CAPACITY
FOR THE TOUGHEST WORK LOADS**

*Micrograph through
longitudinal cross section of
steel shows how fibrous
fiber-like structure that is common
in high quality forgings.*



A REFERENCE BOOK ON FORGINGS FOR ALL USERS OF METAL PARTS

Sixty pages of authoritative information on metal quality as developed in forgings formed through the use of closed-impression dies. Forging production techniques are described and illustrated; economic advantages of forgings are presented from the viewpoint of top management, design engineers, metallurgists and production executives. Your copy is ready. Fill in and attach coupon below to your business letterhead.

* * *

A product fortified with the metal quality found in forgings outperforms other products. Forgings' grain structure and fiber-like flow lines are controlled, directed, and concentrated at points where the highest stress and shock occur under actual service conditions. High tensile and impact strength, the reduction of dead weight, and freedom from concealed defects

are some of the advantages which are obtainable in forgings.

Now is an excellent time to check your product for cost reductions—explore every possibility to improve performance and appearance, while reducing dead weight of component parts. Double check all parts subject to the greatest stress and strain. Check machining and finishing time schedules—forgings have been known to speed up production by 250 per cent. Rejects at the point of assembly are costly—a needless waste; forgings offer practically a 100 per cent yield of sound parts—and they respond uniformly to heat treatment. Consult a forging engineer—only a forging engineer can inform you fully regarding the many advantages obtainable with forgings.

Please send 60-page booklet entitled "Metal Quality—How Hot Working Improves Properties of Metal", 1949 Edition.

Name _____

Position _____

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Address _____

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has a waist-high work level which cuts operator fatigue.

Rigid construction plus positive holding increase wheel life by accomplishing straight cuts to close tolerances with a minimum of burr. High operating speed reduces possibility of burn in the metal. Vise is mounted on a swivel plate for change from straight to 90 degree cutting to any desired angle.

Check No. 19 on Reply Card for more Details

Spindle Nose Lathe Collet Chuck

Composed of special Hycar synthetic rubber which is bonded and mechanically locked to hardened and ground tool steel jaws, the new spindle nose lathe collet chuck developed by Jacobs Mfg. Co., West Hartford, Conn., has a full $\frac{1}{8}$ -inch gripping range. On this basis, eleven Rubber-Flex collets are needed to chuck any bar between 1/16 and 1 $\frac{1}{8}$ inches.

Collet chuck hand wheel is of solid aluminum and all working parts are of hardened and ground alloy steel. Chuck body is an alloy steel forging which is hardened and ground. Models available are for camlock, taper key drive, American Standard and threaded spindles. Work is easily tightened and loosened in the chuck and a special impact mechanism locks the work in place and frees it.

Check No. 20 on Reply Card for more Details

• • •

VALVES: Three-way air valves designated as FT-102, developed by Mead Specialties Co., Chicago 41, Ill., have $\frac{3}{8}$ -inch pipe thread apertures for use with air cylinders up to 6-inch bore, and operate by a light touch on handle-lever button. Model FC-102 does not have the lever and operates by a cam or trigger on the working machine.

Check No. 21 on Reply Card for more Details

GRINDER—For operation of grinding wheels of $\frac{1}{2}$ -inch diameter and smaller, a 15-ounce pneumatic grinder is announced by Keller Tool Co., Grand Haven, Mich. Known as 30A-7, it has a speed of 75,000 rpm.

Check No. 22 on Reply Card for more Details

RESIN BINDER: A liquid, synthetic resin binder for sand cores and dry molds is announced by American Cyanamid Co., New York 20, N. Y. Known as Cycor 191, it can be pumped and/or metered.

Check No. 23 on Reply Card for more Details

FIXTURE HANGER: SFH fixture hanger for fluorescent lighting fixtures is manufactured with a pair of snug fitting clips which hook firmly to the ears of the outlet box. Equipped with pear-shaped screw holes, it may

be mounted in place without removing screws from outlet box. Made by Appleton Electric Co., Chicago 13, Ill., it is available with two-wire receptacle or with three-wire, twist-lock receptacle.

Check No. 24 on Reply Card for more Details

HANDLING BASKET: Jaxon Wire Products, Jackson, Mich., announces heavy mesh baskets for handling small and medium-sized parts. Open mesh construction permits oils and other liquids to drain off. Parts can be run through baths without removal from baskets.

Check No. 25 on Reply Card for more Details

PILLOWBLOCK: Silver Engineering Works Inc., Denver 5, Colo., offers a pillowblock with U-bolt construction, Timken double row bearings and self-aligning design. It is recommended for use with commercial grade shafting, structural steel and wherever shock, dust or weather is a problem.

Check No. 26 on Reply Card for more Details

PILOT VALVES: Hanna Engineering Works, Chicago 22, Ill., announce a series of small pilot valves for direct control of small cylinders or automatic control of large cylinders. They are available in cam, lever, pushbutton or foot operated types.

Check No. 27 on Reply Card for more Details

COLLAPSIBLE BOX: Truscon Steel Co., Cleveland 4, O., offers a new steel collapsible box that can be readily set up or knocked down and is easily handled with platform or fork truck. When in position sides are locked by pin and slide bolt arrangement. Box can be tiered, loaded or empty, when set up.

Check No. 28 on Reply Card for more Details

ELECTRODE: EutecticTrode 4/49 for alternating or direct current is introduced by Eutectic Welding Alloys Corp., New York 13, N. Y., for welding manganese steel or for overlaying work. It has a Rockwell hardness of C 26-34 and is available in sizes 3/16, 5/32 and $\frac{1}{8}$ -inch.

Check No. 29 on Reply Card for more Details

RESIN COATING: CarboLine Co., St. Louis 5, Mo., is offering a new type of corrosion resisting resin coating that is made for application at room temperature, requires no mixing and is flexible when dry. It is resistant to high concentration acids, high liquid temperatures, and to such solvents as the alcohols and straight chain chlorinated and aromatic hydrocarbons. A limited quantity is available at no charge for experimental and test purposes.

Check No. 30 on Reply Card for more Details

ADAPTERS: Kase Machine Co., Cleveland 19, O., offers tapered eccentric bushing-type adapters which have been developed to facilitate cutting of tapered keyways in straight bores, straight keyways in taper bores and tapered keyways in taper bores with company's standard Glynn broaches. Available in sizes ranging from $\frac{1}{2}$ to 2 inches in increments of 1/32-inch.

Check No. 31 on Reply Card for more Details

BATTERY CHARGER: Known as KX Charg-O-Matic, the new type battery charger offered by Hertner Electric Co., Cleveland, O., is of the fully automatic motor-generator type, single circuit. Electrically driven selective time clock switch provides automatic cutoff at end of charge period.

Check No. 32 on Reply Card for more Details

FIXTURE AND STAND: Model 100 all purpose sharpening fixture for sharpening carbide tipped tools, cutters and all types of circular saws from 1 $\frac{1}{2}$ to 12 inches in diameter, and model 300 dustproof ball bearing grinding wheel stand are announced by Treyco Products, Buffalo 17, N. Stand is designed for two grinding wheels, one at each end of the shaft.

Check No. 33 on Reply Card for more Details

FINISHER: Smooth, vibrationless vibration and straight line sanding, rubbing and polishing are features of the new portable, electric model 1000 finisher, announced by Detroit Surface Finishing Machine Co., Detroit 4, Mich. Straight line sanding duplicates natural back and forth motion of hand work.

Check No. 34 on Reply Card for more Details

COMBUSTION SAFEGUARD: Bristol Co., Waterbury, Conn., has developed a new combustion safeguard known as electronic Pyrotrol. It protects gas-fired furnaces, ovens, kilns, boilers, dryers, kettles and other similar industrial heating equipment from danger of gas explosions during ignition, operation and shut down. If normal operation fails at any stage, lighting up cycle stops and closes any valve that has opened.

Check No. 35 on Reply Card for more Details

FOR MORE INFORMATION

on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

Strip & Spring Steel

recision Steel Warehouse, Inc.—ge illustrated pocket size cata-
No. 50 gives complete specifica-
on all company's steel prod-

It serves also as reference
for steel buyers and users by
ing glossary of trade terms,
and SAE steel analyses, deci-
equivalent tables, weight tables,
arative tables on Rockwell and
ell hardness and other aids.

Lighting Equipment

jamin Electric Mfg. Co.—40-
illustrated catalog "Benjamin
Equipment for Industry and
merce" contains specifications,
prices and lighting data on units
use in Sky-Glo luminous louvered
m which provides inconspicuous
high-level lighting of offices and
mercial locations. Also included
formation on equipment for prop-
unimation of indoor and outdoor
trial areas.

Abrasive Segments

monds Abrasive Co.—4-page il-
lustrated form No. ESA-188 explains
abrasive segments are used in
ice and machine knife grinding.
dition to discussing abrasives
bonds employed, publication in-
es segment grain and grade rec-
ommendations for specific grinding
ations.

Electro-Chemograph

eds & Northrup Co.—4-page il-
lustrated folder No. EM9-90(1) shows
E electro-chemograph for mak-
wide range of polarographic an-
es in research and in industrial
ess control laboratories. This al-
ating current or battery operated
ment includes in one compact
net a Speedomax type G micro-
ere recorder; polarizer and, for
60-cycle operation, power sup-
unit that provides constant direct
ent power.

Magnetic Holding Tools

own & Sharpe Mfg. Co.—20-page
trated booklet "Magnetic Chucks
Other Magnetic Holding Tools"
ents information on permanent
rectangular magnetic chucks,
ary top plates, magnetic chuck
ells, rotary model chuck, adapt-
and pulleys, special magnetic
ks and holding devices, magnetic
ts and V-blocks and dial test in-
ors.

Resistance Welding

istance Welding Institute—32-
illustrated booklet entitled "De-
for Resistance Welding" ex-
s advanced techniques in resist-
welding processes. Theory and
cation of spot, seam, projection
butt welding are covered.

80. Metal Forming

Coast Metals, Inc. — Illustrated
booklet No. 849 details Hard metal
surfacing of parts subject to high
abrasion. Given also are production
records of Hard cast rolls in metal
forming operations.

81. Car Pullers

American Hoist & Derrick Co.—8-
page illustrated catalog No. 100-H-
13C depicts electric car pullers of
capstan, drum and continuous rope
types. Specifications, engineering
data and selection factors are given
also.

82. Shelving

Frick-Gallagher Mfg. Co.—4-page
illustrated folder J-213 discusses sav-
ings obtained from efficient rotating
and straight shelving layouts. Rota-
bin shelving units are shown used
singly or in combination with straight
shelving or counters.

83. Selenium Rectifiers

Westinghouse Electric Corp. — 8-
page illustrated booklet DB-19-025
describes standard and high-voltage
selenium rectifiers for power supplies
and electronic circuits. Efficiency
curves, life characteristics and tabu-
lar information are given also.

84. Strain Gages

Baldwin Locomotive Works — 12-
page illustrated catalog and domestic
price list on SR-4 bonded resistance
wire strain gages distinguishes 11
types of gages and lists 102 stand-
ard gages classified by types of wire
and cementing materials to be used.
Single table gives electrical resist-
ances, gage factors, dimensions and
prices.

85. Air Conditioning

Buffalo Forge Co.—16-page illus-
trated bulletin No. 3158B describes
type PCLW central air conditioning
equipment, presents information on
components, tells how to select coils,
explains use of psychrometric chart,
and lists installation and mainten-
ance instructions.

86. Rust Preventives

E. F. Houghton & Co.—8-page il-
lustrated catalog presents eleven
Rust Veto rust preventive compounds
for coating metals to protect them
against exposure and corrosive fumes.
Line includes three dry film solvent
types, oil solvent type, fingerprint
neutralizer, three oil and two grease
types of rust preventives and concen-
trate for economical plant dilution.

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7	27	47	67	87
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10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
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STEEL

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Please send Literature Price information Nearest
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HELPFUL LITERATURE

87. Cyaniding Furnace

Dow Furnace Co. — 4-page illustrated data folder relates history of batch type controlled atmosphere furnace in actual plant operation and demonstrates cost saving advantages of gas cyaniding. Versatility of furnace in performing gas carburizing, clean hardening and carbon restoration operations is discussed also.

88. Lathe Tool Holders

Bokum Tool Co. — 4-page illustrated form 483 shows use of boring and threading tool holders with vertical adjustment for holding tools in lathes. Holders are made in two sizes: BT-0 shank, size $\frac{3}{8}$ x 1 in., adjustable from $\frac{5}{8}$ to 1 in.; and BT-1 shank, size $\frac{1}{2}$ x $1\frac{1}{4}$, adjustable from 13/16 to 1-5/16 in.

89. Acid-Alkaliproof Products

Chemsteel Construction Co. — 8-page illustrated booklet "Specialists in Acid-Proof Construction for All Industry" explains engineering service which includes recommending, designing and erection of acid-alkaliproof tanks, chemical reactors, scrubbing towers, fume ducts, floors, trenches, sewers and manholes where resistance to heat, thermal shock, mechanical abuse, abrasion and erosion are required. Typical examples of installations are depicted.

90. V-Belting

Manheim Mfg. & Belting Co. — 24-page illustrated brochure entitled "Veebelo the Link V-Belt" presents essential information on selection, application and construction of this type V-belt.

91. Welding Fasteners

Ohio Nut & Bolt Co. — 4-page illustrated bulletin No. 496 is index of fasteners and fittings for projection and spot welding. Bolts, knobs, nuts, studs, pins, handles, mounting lugs, brackets and screws are produced in low carbon steel, high brass and 18-8 stainless steel.

92. Flexible Hose Assemblies

Resistoflex Corp. — 4-page illustrated bulletin "Synthetic Flexible Products and Parts for Industry" describes Compar-tubed flexible hose assemblies for original equipment. Typical uses such as in hydraulic, refrigerant, lubrication and chemical lines are cited.

93. Industrial Relays

Ward Leonard Electric Co. — Illustrated catalog No. D-20A describes various types of relays carried in stock and gives contact ratings, coil specifications, sizes, current list prices and other data on alternating and direct current units.

94. Cutting Oils

Sun Oil Co. — 12-page illustrated form A-2002 on Sunicut 812W 817W cutting oils discusses their on automatics machining low-carbon steels, alloy steels and brass. They are transparent nonemulsifying purpose oils compounded with Pe fac all-petroleum additive.

95. Gray Iron Castings

Superior Foundry, Inc. — 8-page illustrated bulletin S101 describes electric furnace process for producing types of alloy and plain cupola gray iron castings. Supported with diagrams and results of arbitration bar tests, booklet offers factual information about qualities of electric furnace iron.

96. Aluminum Fabrication

Aluminum Goods Mfg. Co. — page illustrated brochure A-68 views rolling, die making, stamp heat treating, welding and finish facilities which are available for tract production of aluminum products. Depicted include stamp and moldings, aircraft tanks parts, utensils and automotive products. Chemical, metallurgical engineering departments are scribed.

97. Corrosion Service Piping

Taylor Forge & Pipe Works — page illustrated bulletin 485 is comprehensive treatment of stainless steel and nickel alloy anticorrosion and anticontamination piping. Extensive technical data, design standards and complete dimensional information on stainless fittings flanges are included.

98. Hardfacing Products

American Manganese Steel I American Brake Shoe Co. — 4-page bulletin CC-3 is selector and comparison chart of hardfacing rods and electrodes. Metallurgical and physical descriptions of each rod are arranged to simplify selection and of service for which each is designed is indicated.

99. Drop Forgings & Products

Merrill Brothers — 30-page illustrated catalog No. 51 discusses types of forgings and production facilities explains where and how to use of forgings; and presents data on buckles, clevis nuts, drop for shackles, eye bolts, and drop for materials handling devices.

100. Dry Cyaniding Furnaces

Surface Combustion Corp. — 4-page illustrated folder SC-145 discusses application of dry cyaniding process operation of continuous and batch type industrial furnaces. Process essentially case hardening of steel in atmosphere containing carburing gas with ammonia added in controlled amounts.

FOR MORE INFORMATION

USE ONE OF THESE CARDS . .

STEEL

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Please send Literature Price information Nearest source of supply on the items circled at the left.

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CREEPING industrial paralysis threatens the metalworking industry due to the steel and coal strikes. Unprecedented contraction of activities is predicted next month unless the labor disputes are settled. Time is running out; steel is running short. While comparatively few fabricators have curtailed operations to date for lack of steel, the number will grow daily. And consumers' inventories will begin to evaporate or become too unbalanced to permit economical production in many plants by end of October. Some order cancellations are coming from shops unable to maintain processing schedules. End-use cancellation of castings is noted with some consumers running shy of steel for certain assemblies. Wholesale shutdowns are expected as the effect of the strikes fans out to embrace an ever-widening area of the economy.

LABOR—No end of the steel strike is yet in sight despite efforts of government mediators to lay groundwork for settlement. A number of small steelmakers and fabricators have accepted the union's pension and insurance terms but such action is not considered indicative of the way the wind is blowing. More steelworks and fabricating shops are being struck as their union contracts expire.

OPERATIONS—For the second successive week production of steel ingots and castings fell below the 200,000-ton mark. This compares with pre-strike weekly output of around 1,500,000 tons. The estimated national ingot rate rose fractionally to 8 per cent of capacity.

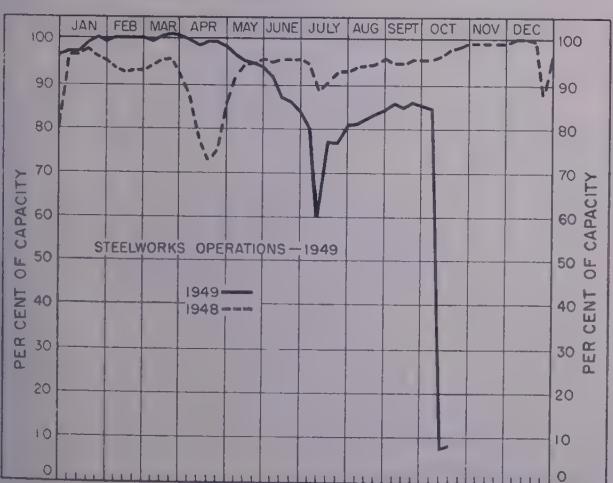
SUPPLIES—Size of consumer steel inventories at beginning of the third week of the steel walk-out varies widely. At strike's start stocks averaged about 30-days' supply. But manufacturers have been chewing metal up at a fast pace, putting a big dent in what two weeks ago appeared to be comfortable supplies. Some larger manufacturers are well fixed and can keep their components suppliers going for a

while. But the situation looms increasingly serious each day the strike is prolonged.

DEMAND—Growing maladjustment in metalworking plants is reflected in intensified efforts to get in supplies. Warehouses are entertaining inquiry swollen far beyond normal. Growing disposition by consumers to take in extra-premium priced steel is noted. The few steel mills still operating are in receipt of far more inquiry than they can handle in most items. Exceptions may be in plates and certain types of wire. Pressure for the flat-rolled products is extremely heavy. Looking beyond the strike, some buyers are seeking sheets for first quarter delivery but tonnage is being declined except from regular customers. Railroads are placing rail orders for 1950 delivery.

PRICES—Some uncertainty prevails over the steel price trend. This arises from increases just effected by several small steelmakers that have accepted the union's pension and insurance demands. In the main it is believed the price line will hold but there is no certainty of this. Over the past ten days the John A. Roebling's Sons Co. and the Seneca Wire & Mfg. Co. raised prices on several items \$10 per ton. An increase of \$5 per ton on plates also was made by Central Steel Division, Barium Steel Corp.

COMPOSITES—STEEL's weighted index of finished steel holds unchanged at 152.52. Arithmetical price composite on finished steel advanced to \$91.64 from \$91.55, reflecting an upward revision in plate prices by one eastern seller. This compares with \$95.05 a year ago. The steelmaking scrap composite eased to \$26.75 from \$27.25 and compares with \$43.25 a year ago. Scrap is moving slowly but the undertone continues strong. Composites on pig iron are unchanged and compare with a year ago as follows: Basic iron, \$45.60 and \$46.29; No. 2 foundry, \$46.10 and \$46.50; malleable iron, \$47.27 and \$47.20.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Oct. 15	Change	Same Week 1948	1947
Pittsburgh	3.5	None	96.5	105
Chicago	4.5	— 1.5	97.5	95
Eastern Pa.	8.5	+ 1	94	91.5
Youngstown	0	None	101	92
Wheeling	59.5	+ 0.5	90	93.5
Cleveland	0	None	98.5	92
Buffalo	0	None	104	88.5
Birmingham	6	+ 2	100	99
New England	52	None	87	84
Cincinnati	46	— 6	103	94
St. Louis	89.5	+ 5	89.5	80
Detroit	0	None	101	88
Western	28	+ 1	...	...
Estimated national rate	8	+ 0.5	98	96

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947.

Composite Market Averages

	Oct. 13 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	152.52	152.52	152.52	151.86	99.16
Index in cents per lb ..	4.132	4.132	4.132	4.114	2.686

ARITHMETICAL PRICE COMPOSITES:

Finished Steel, NT.....	\$91.64	\$91.55	\$91.55	\$95.05	\$56.73
No. 2 Fdry Pig Iron, GT.....	46.10	46.10	46.10	46.50	23.67
Malleable Pig Iron, GT.....	47.27	47.27	47.27	47.20	24.29
Basic Pig Iron, GT.....	45.60	45.60	45.60	45.29	23.00
Steelmaking Scrap, GT.....	26.75	27.25	26.92	43.25	16.55

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Oct. 13 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pitts.....	3.35	3.35	3.35	3.45	2.15
Bars, H.R., del. Phila.....	3.83	3.83	3.83	3.79	2.47
Bars, H.R., Chicago.....	3.35	3.35	3.35	3.35	2.15
Bars, C. F., Pitts.....	3.95-4.00	3.95-4.00	3.95-4.00	3.95-4.25	2.65
Bars, C.F., Chicago.....	4.00	4.00	4.00	4.00	2.65
Shapes, Std., Pitts.....	3.25	3.25	3.25	3.25-30	2.10
Shapes, Std., Chicago.....	3.25	3.25	3.25	3.25	2.10
Shapes, del. Phila.....	3.50	3.50	3.50	3.48	2.215
Plates, Pittsburgh.....	3.40	3.40	3.40	3.40-60	2.10
Plates, Chicago.....	3.40	3.40	3.40	3.40	2.10
Plates, Coatesville, Pa.....	3.50	3.50	3.50	3.75	2.10
Plates, Sparrows Point, Md.....	3.40	3.40	3.40	3.45	2.10
Plates, Claymont, Del.....	3.50	3.50	3.50	3.95	2.10
Plates, del. Phila.....	3.59	3.59	3.59	3.71	2.15
Sheets, H.R., Pitts.....	3.25	3.25	3.25	3.25-30	2.10
Sheets, H.R., Chicago.....	3.25	3.25	3.25	3.25	2.10
Sheets, C.R., Pitts.....	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Chicago.....	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Detroit.....	4.20	4.20	4.20	4.20	3.15
Sheets, Galv., Pitts.....	4.40	4.40	4.40	4.40	3.50
Strip, H.R., Pitts.....	3.25	3.25	3.25	3.25-70	2.10
Strip, H.R., Chicago.....	3.25	3.25	3.25	3.25-30	2.10
Strip, C.R., Pitts.....	4.00	4.00	4.00	4.00-75	2.80
Strip, C.R., Chicago.....	4.00-15	4.00-15	4.00-15	4.00-25	2.90
Strip, C.R., Detroit.....	4.20-25	4.20-25	4.20-25	4.20-50	2.90
Wire, Basic, Pitts.....	4.15	4.15	4.15	4.15-4.50	2.80
Nails, Wire, Pitts.....	5.15	5.15	5.15	5.15-6.30	2.55
Tin plate, box, Pitts.....	\$7.75	\$7.75	\$7.75	\$6.80	\$5.00

SEMITI-FINISHED

Billets, forging, Pitts.(NT)	\$61.00	\$61.00	\$61.00	\$61.00	\$40.00
Wire rods, $\frac{1}{2}$ - $\frac{3}{4}$ ", Pitts. ..	3.40	3.40	3.40	3.40-4.15	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.....	\$47.00	\$47.00	\$47.00	\$47.00	\$24.50
Basic, Valley.....	46.00	46.00	46.00	46.00	23.50
Basic, del. Phila.....	49.44	49.44	49.44	50.17	25.34
No. 2 Fdry, Pitts.....	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, Chicago.....	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, Valley.....	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, del. Phila.....	49.94	49.94	49.94	50.67	25.84
No. 2 Fdry, Birmingham.....	39.38	39.38	39.38	43.38	20.38
Malleable, Valley.....	46.50	46.50	46.50	46.50	24.00
Malleable, Chicago.....	46.50	46.50	46.50	43.50-46.50	24.00
Charcoal, Lyles, Tenn.....	66.00	66.00	66.00	62.00	33.00
Ferromanganese, Etna, Pa.....	175.00	175.00	163.00	135.00	

SCRAP, Gross Ton

No. 1 Heavy Melt, Pitts. ..	\$29.75	\$29.75	\$29.75	\$42.75	\$17.75
No. 1 Heavy Melt, E. Pa. ..	25.00	25.00	24.50	45.25	15.50
No. 1 Heavy Melt, Chicago.....	27.00	26.50	41.75	16.50	
No. 1 Heavy Melt, Valley. ..	31.25	28.50	42.75	16.25	
No. 1 Heavy Melt, Cleve. ..	26.50	25.00	42.25	15.25	
No. 1 Heavy Melt, Buffalo. ..	28.25	28.25	48.25	17.00	
Rails, Rerolling, Chicago. ..	41.50	41.50	41.50	64.50	22.25
No. 1 Cast, Chicago	41.50	41.50	41.50	70.50	20.00

COKE, Gross Ton

Beehive, Furn., Connsvl. ..	\$13.25	\$13.25	\$13.25	\$14.50	\$7.00
Beehive, Fdry., Connsvl. ..	15.75	15.75	15.75	17.00	7.75
Oven, Fdry, Chicago	20.00	20.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	17.625	17.625	17.625	23.50	12.00
Zinc, E. St. Louis	9.25	9.25	10.00	15.00	8.25
Lead, St. Louis	13.55	14.50	14.925	19.30-35	6.35
Tin, New York	96.00	96.00	103.00	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	32.00	38.50	38.50	38.50	14.50
Nickel, refinery, duty paid	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2	Malleable	Bess.
Bethlehem, Pa. B2	\$48.00	\$48.50	\$49.00	\$49.00
Newark, del.	50.63	51.13	51.13	
Brooklyn, N.Y., del.	52.79	53.29	53.29	
<i>Birmingham District</i>				
Birmingham, Ala. R2, S9	38.88	39.38		
Woodward, Ala. W15	38.88	39.38		
<i>Buffalo District</i>				
Buffalo H1, R2	46.00	46.50	47.00	
Tonawanda, N.Y. W12	46.00	46.50	47.00	
N. Tonawanda, N.Y. T9	46.00	46.50	47.00	
Boston, del.	55.26	55.76	56.20	
Rochester, N.Y., del.	48.63	49.13	49.63	
Syracuse, N.Y., del.	49.58	50.08	50.58	
<i>Chicago District</i>				
Chicago I-3	46.00	46.50	46.50	47.00
Gary, Ind. C3	46.00	46.50	46.50	47.00
Indiana Harbor, Ind. I-2	46.00	46.50	46.50	47.00
So. Chicago, Ill. W14	46.00	46.50	46.50	47.00
So. Chicago, Ill. C3	46.00	46.50	46.50	47.00
So. Chicago, Ill. Y1	46.00	46.50	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.80
Muskegon, Mich. del.	51.98	51.98	51.98	51.98
<i>Cleveland District</i>				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	47.00
Lorain, O. N3	46.00	46.50	46.50	47.00
Duluth, I-3	46.00	46.50	46.50	47.00
Erie, Pa. I-3	46.00	46.50	46.50	47.00
Everett, Mass. E1	50.50	51.00	51.00	
Geneva, Utah G1	46.00	46.50	46.50	
Seattle, Tacoma, Wash. del.	54.20			
Portland, Oreg. del.	54.20			
Los Angeles, San Francisco, del.	53.70	54.20		
Granite City, Ill. M10	47.90	48.40	48.90	
St. Louis, del. (Incl. tax)	48.65	49.15	49.65	
Ironton, Utah C11	46.00	46.50		
Lone Star, Tex. L6	46.00	46.50		
Gulf ports, del.	50.50	51.00		
Minnequa, Colo. C10	47.00	47.50	47.50	
<i>Pittsburgh District</i>				
Neville Island, Pa. P6	46.00	46.50	46.50	47.00
Pitts. N.S. sides, Ambridge, Alquippa, del.	47.19	47.69	47.69	48.00
McKees Rocks, del.	46.95	47.45	47.45	47.45
Lawrenceville, Homestead, McKeesport, Monaca, del.	47.44	47.94	47.94	48.00
Verona, del.	47.90	48.40	48.40	48.40
Brackenridge, del.	48.13	48.63	48.63	48.63
Bessemer, Pa. C3	46.00	46.50	46.50	47.00
Clairton, Rankin, Pa. Duquesne, Pa. C3	46.00	46.50	46.50	47.00
McKeesport, Pa. N3	46.00	46.50	46.50	47.00
Sharpsville, Pa. S6	46.00	46.50	46.50	47.00
Steelton, Pa. B2	48.00	48.50	49.00	49.00
Steubenville, O. W10	46.00			
Struthers, O. S16	46.00			
Swedeland, Pa. A3	48.00	48.50	49.00	49.00
Philadelphia, del.	49.44	49.94	50.44	50.44
Toledo, O. I-3	46.00	46.50	46.50	47.00
Cincinnati, del.	51.01	51.51		
Troy, N.Y. R2	48.00	48.50	49.00	
<i>Youngstown District</i>				
Hubbard, O. Y1	46.00	46.50	46.50	47.00
Youngstown C3	46.00	46.50	46.50	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield, O. del.	50.26	50.76	50.76	51.00

* Low phos, Southern grade.

PIG IRON DIFFERENTIALS

Siicon: Add 50 cents per ton for each 0.25% Si over base grade, 2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and manganese: Add 50 cents per ton for each 0.50% manganese over or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add \$2 per ton each additional 0.25%, add \$1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; Add \$1 for each 0.5% Si to 11.50%)

Jackson, O. J1, G2

Buffalo H1

Niagara Falls, N.Y. P15

Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2

Keokuk, Iowa, OH & Fdry, 12 $\frac{1}{2}$ lb, piglets, frt. allowed K2

Wenatchee, Wash. OH & Fdry, frt. allowed K2

Youngstown, O. del.

Electric Furnace SIVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add \$1 for each 0.5% Si to 18%; \$1

Jackson, O. J1, G2

Buffalo H1

Youngstown C3

Semifinished and Finished Steel Products

Mill prices on Oct. 13, 1949; cents per pound, unless otherwise noted. Price changes are indicated by italic type.
Code number following mill points indicate producing company; key on next two pages.

STRUCTURALS	
Wide Flange	
Bethlehem,Pa.	B2 3.30
Lackawanna,N.Y.	B2 3.30
Munhall,Pa.	C3 3.20
So. Chicago,Ill.	C3 3.20
H.-S. low-Alloy	
Alliquippa,Pa.	J5 4.95
Bessemer,Ala.	T2 4.95
Bethlehem,Pa.(14)	B2 5.05
Claifton,Pa.	C3 4.95
Fairfield,Ala.	T2 4.95
Fontana,Calif.	K1 6.10
Gary,Ind.	C3 4.95
Ind.Harbor,Ind.	I-2, Y1 4.95
Johnstown,Pa.	B2 5.05
Lackawanna,N.Y.	B2 5.05
Munhall,Pa.(14)	C3 4.95
So. Chicago,Ill.(14)	C3 4.95
Struthers,O.	Y1 4.95
Carbon Steel Stand. Shapes	
Alliquippa,Pa.	J5 3.25
Bessemer,Ala.	T2 3.25
Bethlehem,Pa.	B2 3.30
Claifton,Pa.	C3 3.25
Fairfield,Ala.	T2 3.25
Fontana,Calif.	K1 3.80
Gary,Ind.	C3 3.25
Geneva,Utah	G1 3.25
Houston,Tex.	S5 3.65
Ind.Harbor,Ind.	I-2 3.25
Johnstown,Pa.	B2 3.30
KansasCity,Mo.	S5 3.85
Lackawanna,N.Y.	B2 3.30
LosAngeles,B3	. . . . . 3.85
Minnequa,Colo.	C10 3.75
Munhall,Pa.	C3 3.25
Niles,Calif.(22)	P1 3.97
Portland,Oreg.	O4 3.90
Seattle,B3	. . . . . 3.90
So. Chicago,Ill.	C3,W14 3.25
So. SanFrancisco	B3 3.80
Torrance,Calif.	C11 3.85
Weirton,W.Va.	W6 3.25
Alloy Stand. Shapes	
Claifton,Pa.	C3 4.05
Fontana,Calif.	K1 5.25
Munhall,Pa.	C3 4.05
So. Chicago,Ill.	C3 4.05
Sheet Steel Piling	
Ind.Harbor,Ind.	I-2 4.05
Lackawanna,N.Y.	B2 4.05
Munhall,Pa.	C3 4.05
So. Chicago,Ill.	C3 4.05
Weirton,W.Va.	W6 4.05
PLATES Carbon Steel	
AlabamaCity,Ala.	R2 3.40
Alliquippa,Pa.	J5 3.40
Ashland,Ky.(15)	A10 3.40
Bessemer,Ala.	T2 3.40
Claifton,Pa.	C3 3.40
Claymont,Del.	W16 3.50
Cleveland,J5	R2 3.40
Coatesville,Pa.	L7 3.50
Conshohocken,Pa.	A3 3.50
Ecorse,Mich.	G5 3.65
Fairfield,Ala.	T2 3.40
Fontana,Calif.	K1 4.00
Gary,Ind.	C3 3.40
Geneva,Utah	G1 3.40
Ind.Harbor,Ind.	I-2, Y1 3.40
Johnstown,Pa.	B2 3.40
Lackawanna,N.Y.	B2 3.40
Minnequa,Colo.	C10 4.30
Munhall,Pa.	C3 3.40
Pittsburgh,J5	. . . . . 3.40
Seattle,B3	. . . . . 4.30
So. Chicago,Ill.	C3,W14 3.40
SparrowsPoint,Md.	B2 3.40
Steubenville,O.	W10 3.40
Warren,O.	R2 3.40
Weirton,W.Va.	W6 3.40
Youngstown,C3	Y1 3.40
PLATES (Universal Mill)	
Fontana,Calif.	K1 4.30
PLATES, Open-Hearth Alloy	
Coatesville,Pa.	L7 4.50
Conshohocken,Pa.	A3 4.40
Gary,Ind.	C3 4.40
Johnstown,Pa.	B2 4.40
Munhall,Pa.	C3 4.40
Sharon,Pa.	S3 4.40
So. Chicago,Ill.	C3,W14 4.40
SparrowsPoint,Md.	B2 4.40
Steubenville,O.	W10 4.40
Warren,O.	R2 4.40
Weirton,W.Va.	W6 4.40
Youngstown,C3	Y1 4.40
PLATES, Ingot Iron	
Ashland,cl(15)	A10 3.65
Ashland,cl(15)	A10 4.15
Cleveland,cl	R2 3.65
Warren,O.cl	R2 3.65
PLATES, Wrought Iron	
Economy,Pa.	B14 7.85
PLATES, High-Strength Low-Alloy	
Alliquippa,Pa.	J5 5.20
Bessemer,Ala.	T2 5.20
Claifton,Pa.	C3 5.20
Cleveland,J5	R2 5.20
Conshohocken,Pa.	A3 5.20
Ecorse,Mich.	G5 5.45
Fairfield,Ala.	T2 5.20
Fontana,Calif.	K1 5.80
Gary,Ind.	C3 5.20
Geneva,Utah	G1 5.20
Houston,Tex.	S5 5.60
Ind.Harbor,Ind.	I-2, Y1 5.20
Johnstown,Pa.	B2 5.20
Lackawanna,N.Y.	B2 5.20
Munhall,Pa.(14)	C3 5.20
So. Chicago,Ill.(14)	C3 5.20
Struthers,O.	Y1 5.20
FLOOR PLATES	
Cleveland,J5	. . . . . 4.55
Conshohocken,Pa.	A3 4.55
Harrisburg,Pa.	C5 4.55
Ind.Harbor,Ind.	I-2 4.55
Johnstown,Pa.	B2 5.10
Munhall,Pa.	C3 4.55
So. Chicago,Ill.	C3 4.55
BARS, Hot-Rolled Carbon	
AlabamaCity,Ala.	R2 3.35
Alliquippa,Pa.	J5 3.35
Alton,Ill.(1)	L1 3.35
Ashland,Ky.(17)	A10 3.35
Atlanta,GA	A11 3.50
Buffalo,R2	. . . . . 3.35
Canton,O.	R2,T7 3.75
Canton,O.	R2 3.75
Cleveland,R2	. . . . . 3.35
Ecorse,Mich.	G5 4.05
Fontana,Calif.	K1 4.75
Gary,Ind.	C3 3.75
Houston,Tex.	S5 4.15
Fairfield,Ala.	T2 3.35
Fontana,Calif.	K1 4.00
Gary,Ind.	C3 3.35
Houston,Tex.	S5 3.75
Ind.Harbor,Ind.	I-2, Y1 3.35
KansasCity,Mo.	S5 3.95
Lackawanna,N.Y.	B2 3.75
LosAngeles,B3	. . . . . 4.05
Midland,Pa.	C18 3.35
Minnequa,Colo.	C10 3.85
Niles,Calif.	P1 4.05
N.Tonawanda,N.Y.	B11 3.35
Pittsburg,Calif.	C11 4.05
Portland,Oreg.	O4 4.10
Seattle,B3	N14 4.10
S.Chicago,C3,R2	W14 3.35
Youngstown,C3	R2 3.35
BARS, Hot-Rolled Alloy	
Bethlehem,Pa.	B2 5.10
Bessemer,Ala.	T2 5.10
Claifton,Pa.	C3 5.10
Cleveland,R2	. . . . . 5.10
Ecorse,Mich.	G5 5.30
Fairfield,Ala.	T2 5.10
Fontana,Calif.	K1 6.15
Gary,Ind.	C3 5.10
Huntington,W.Va.	T4 4.25
Ind.Harbor,Ind.	I-2, Y1 5.25
Johnstown,Pa.	B2 5.10
Lackawanna,N.Y.	B2 5.10
Pittsburg,J5	. . . . . 5.10
So.Duquesne,Pa.	C3 5.10
Struthers,O.	Y1 5.10
Youngstown,Y1	. . . . . 5.20
BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy	
Alliquippa,Pa.	J5 5.10
Bessemer,Ala.	T2 5.10
Claifton,Pa.	C3 5.10
Cleveland,R2	. . . . . 5.10
Ecorse,Mich.	G5 5.30
Fairfield,Ala.	T2 5.10
Fontana,Calif.	K1 6.15
Gary,Ind.	C3 5.10
Huntington,W.Va.	S3 3.75
Ind.Harbor,Ind.	I-2, Y1 5.25
Johnstown,Pa.	B2 5.10
Lackawanna,N.Y.	B2 5.10
Pittsburg,J5	. . . . . 5.10
So.Duquesne,Pa.	C3 5.10
Struthers,O.	Y1 5.10
Youngstown,C3	Y1 5.10
RAIL STEEL BARS	
ChicagoHts,Ill.	I-2 3.25
FortWorth,Tex.	T4 4.33
Huntington,W.Va.	S3 3.75
Moline,Ill.	R2 3.35
Williamsport(2,3)	S19 3.35
Williamsport(4)	S19 3.85
BARS, Reinforcing (Fabricated; to Consumers)	
Huntington,W.Va.	W7 4.50
Johnstown,I-4	1/2" B2 4.25
LosAngeles,B3	. . . . . 5.00
Pittsburgh,J5	. . . . . 4.25
Seattle,B3,N14	. . . . . 5.00
So.SanFrancisco	B3 5.00
SparrowsPt,1/2-1/4"	B2 4.83
SparrowsPt,3/4-1/2"	B2 4.25
BARS, Wrought Iron	
Economy,Pa.(S.R.)	B14 9.50
Economy,Pa.(D.R.)	B14 11.00
Economy(Stabilt)	B14 11.30
McK.Rks.(S.R.)	L5 8.60
McK.Rks.(D.R.)	L5 11.25
McK.Rks.(Staybolt)	L5 12.75
BARS, Hot-Rolled Ingot Iron	
Ashland,Ky.	(17) A10 3.60
SHEETS, Hot-Rolled Steel (18 gage and heavier)	
AlabamaCity,Ala.	R2 3.25
Ashland,Ky.	(8) A10 3.25
Butler,Pa.	A10 3.25
Cleveland,J5	R2 3.25
Conshohocken,Pa.	A3 3.25
Ecorse,Mich.(8)	G5 3.45
Fairfield,Ala.	T2 3.25
Fontana,Calif.	K1 4.15
Gary,Ind.	C3 3.25
Huntington,W.Va.	S1 3.25
Ind.Harbor,Ind.	I-2, Y1 3.25
Johnstown,Pa.	B2 3.75
KansasCity,Mo.	S5 4.35
Lackawanna,N.Y.	B2 3.75
Massillon,O.	R2 3.75
Midland,Pa.	C18 3.75
S.Chicago,C3,R2	W14 3.75
So.Duquesne,Pa.	C3 3.75
Struthers,O.	Y1 3.75
Warren,O.	C17 3.75
Youngstown,C3	Y1 3.75
BARS, Cold-Finished Alloy	
Alliquippa,Pa.	K5 4.65
Ambridge,Pa.	W18 4.65
BeaverFalls,Pa.	M12 4.65
Bessemer,Ala.	B2 4.65
Buffalo,B5	. . . . . 4.65
Canton,O.	R2,T7 4.65
Carnegie,Pa.	C12 4.65
Chicago,W18	. . . . . 4.65
Cleveland,A7,C20	. . . . . 4.65
Donora,Pa.	A7 4.65
Elyria,O.	W8 4.65
Gary,Ind.	R2 4.65
Hammond,Ind.	L2,M13 4.65
Hartford,Conn.	R2 4.65
Harvey,Ill.	B5 4.65
Indianapolis	M13 4.85
Lackawanna,N.Y.	B2 4.85
Mansfield,Mass.	B5 4.95
Massillon,O.	R2,R8 4.65
Midland,Pa.	C18 4.65
Monaca,Pa.	S17 4.65
Newark,N.J.	W18 4.95
Putnam,Conn.	W18 4.95
Youngstown,C3	R2 4.35
BARS, Cold-Finished (Fabricators)	
AlabamaCity,Ala.	R2 3.35
Alton,III.(6)	L1 3.35
Atlanta,GA	A11 3.50
Buffalo,R2	. . . . . 3.35
Cleveland,R2	. . . . . 3.35
Emeryville,Calif.	J7 4.10
Fairfield,Ala.	T2 3.35
Fontana,Calif.	K1 4.00
Gary,Ind.	C3 3.35
Houston,Tex.	S5 3.75
Ind.Harbor,Ind.	I-2, Y1 3.35
Johnstown,Pa.	B2 3.35
KansasCity,Mo.	S5 3.95
Lackawanna,N.Y.	B2 3.35
LosAngeles,R2	. . . . . 4.05
Niles,Calif.	P1 4.05
Pittsburg,Calf.	C11 4.05
Seattle,Wash.	B3,N14 4.10
So.Chicago,Ill.	R2 3.35
Youngstown,Y1	. . . . . 4.00
SHEETS, Cold-Rolled, High-Strength Low-Alloy	
Cleveland,J5	R2 4.00
Ecorse,Mich.	G5 4.20
Fairfield,Ala.	T2 4.00
Follansbee,W.Va.	F4 4.00
Fontana,Calif.	K1 4.90
Gary,Ind.	C3 4.00
GraniteCity,Ill.	G4 4.20
Ind.Harbor,Ind.	I-2, Y1 4.00
Irvin,Pa.	C3 4.00
Lackawanna,N.Y.	B2 4.00
Middletown,O.	A10 4.00
Pittsburg,Calif.	C11 4.00
Steeberville,W.O.	W10 4.00
Warren,O.	R2 4.00
Weirton,W.Va.	W6 4.00
Youngstown,Y1	. . . . . 4.00
SHEETS, Cold-Rolled, High-Strength Low-Alloy	
Cleveland,J5	R2 6.05
Ecorse,Mich.	G5 6.25
Fairfield,Ala.	T2 6.05
Follansbee,W.Va.	F4 6.05
Fontana,Calif.	K1 6.05
Gary,Ind.	C3 6.05
Ind.Harbor,Ind.	I-2, Y1 6.05
KansasCity,Mo.	S5 6.05
Lackawanna,N.Y.	B2 6.05
Fontana,Calif.	K1 6.95
Gary,Ind.	C3 6.95
Ind.Mansfield	B5 6.95
Irvin,Pa.	C3 6.95
Lackawanna,N.Y.	B2 6.95
Steeberville,W.O.	W10 6.95
Warren,O.	R2 6.95
Weirton,W.Va.	W6 6.95
Youngstown,Y1	. . . . . 6.95

SHEETS, H-R (14 ga., heavier)		SHEETS, Culvert,	Cu	Cu	SHEETS, Hot-Rolled Ingot Iron		STRIP, Hot-Rolled Carbon		Pawtucket, R.I. (12) NS.
High-Strength Low-Alloy		No. 16 Flat	FE	18 Gage and Heavier		Alton, Ill. (1) L1	3.25	Sharon, Pa. S3	
Cleveland, J5, R2	4.95	Ashland, A10	5.00		Ashland, Ky. (8) A10	3.50	Ashland, Ky. (8) A10	3.25	Worcester, Mass. A7
Conshohocken, Pa. A3	4.95	Canton, O. R2	5.05	5.50	Cleveland R2	3.85	Atlanta, A11	3.40	Youngstown C8
Ecorse, Mich. G5	5.15	Fairfield, Ala. T2	5.00	5.35	Ind. Harbor, Ind. I-2	3.50	Bessemer, Ala. T2	3.25	STRIP, Cold-Rolled Carbon
Fairfield, Ala. T2	4.95	Gary C3	5.00	5.35	Warren, O. R2	3.85	Bridgept, Conn. (10) S15	3.25	Berea, O. C7
Fontana, Calif. K1	6.64	GraniteCity G4	5.40	5.70	SHEETS, Cold-Rolled Ingot Iron		Butler, Pa. A10	3.25	Bridgept, Conn. (10) S15
Gary, Ind. C3	4.95	Irvin C3	5.00	5.35	Cleveland R-2	4.60	Carnegie, Pa. S18	3.25	Butler, Pa. A10
Ind. Harbor, Ind. I-2, Y1	4.95	Kokomo C16	5.40		Middletown, O. A10	4.50	Cleveland J5	3.25	Cleveland A7, J5
Irvin, Pa. C3	4.95	MartinsFerry, O. W10	5.00	5.35	Warren, O. R2	4.60	Detroit MI	3.45	Cleveland A7, J5
Lackawanna, N.Y. B2	4.95	Pittsburg, Cal. C11	5.75		SHEETS, Galvanized Ingot Iron		Butler, Pa. A10	3.25	Detroit D2, D3
Pittsburg, J5	4.95	SparrowsPt. B2	5.00		No. 10 Flat		Ecorse, Mich. G5	3.45	Chicago, Ill. T6
Sharon, Pa. S3	4.95	Torrance, Cal. C11	5.75		Ashland, Ky. (8) A10	4.65	Fairfield, Ala. T2	3.25	Detroit D2, D3
So. Chicago, Ill. C3	4.95	SHEETS, Culvert,			Canton, O. R2	5.15	Gary, Ind. C3	4.40	Detroit MI
SparsrowsPoint, Md. B2	4.95	No. 16 Flat Ingot Iron			Ind. Harbor, Ind. I-2	4.95	Houston, Tex. S5	3.65	Dover, O. G6
Warren, O. R2	4.95	Ashland, Ky. A10	5.25		SHEETS, Zincgrip No. 10 Flat, Ingot Iron		KansasCity, Mo. (9) S5	3.85	Follansbee, W.Va. F4
Weirton, W.Va. W6	4.95				Butler, Pa. A10	4.90	Fontana, Calif. K1	4.40	Fontana, Calif. K1
Youngstown C3, Y1	4.95				Middletown, O. A10	4.90	Ind. Harbor, Ind. I-2, Y1	3.25	Ind. Harbor, Ind. I-2
SHEETS, Gal'zd No. 10 Steel		SHEETS, Well Casing			HOLLOWARE ENAMELING		Lackawanna, N.Y. B2	3.25	Lackawanna, N.Y. B2
AlabamaCity, Ala. R2	4.40	Torrance, Calif. C11	4.75		Block Plate (29 gage)		Milton, Pa. B6	3.25	Los Angeles C1
Ashland, Ky. (8) A10	4.40	Youngstown C3	3.75		Aliquippa, Pa. J5	5.30	Minnequa, Colo. C10	4.30	Mattapan, Mass. (21) T6
Canton, O. R2	4.40	SHEETS, Aluminized			Gary, Ind. C3	5.30	NewBritain (10) S15	3.25	Middletown, O. A10
Delphos, O. N16	5.40	Butler, Pa. A10	7.75		Ind. Harbor, Ind. Y1	5.30	N. Tonawanda, N.Y. B11	3.30	NewBritain (10) S15
Dover, O. R1	5.40	SHEETS, Long Terne, Steel (No. 10; Commercial Quality)			Irvin, Pa. C3	5.30	Pittsburg, Calif. C11	4.00	New Castle, Pa. B4
Fairfield, Ala. T2	4.40	Aliquippa, Pa. J5	5.30		Irvin, Pa. C3	5.30	Pittsburg, Calif. C11	4.00	New Haven, Conn. A7, D2
Gary, Ind. C3	4.40	Follansbee, W.Va. F4	5.30		Irvin, Pa. C3	5.30	Pittsburgh J5	3.25	Riverdale, Ill. A1
GraniteCity, Ill. G4	4.60	Gary, Ind. C3	5.30		Irvin, Pa. C3	5.30	Torrance, Calif. C11	4.00	Sharon, Pa. S3
Ind. Harbor, Ind. I-2	4.40	GraniteCity, Ill. G4	5.50		Irvin, Pa. C3	5.30	SparsrowsPoint, Md. B2	3.25	SparsrowsPoint, Md. B2
Irvin, Pa. C3	4.40	Ind. Harbor, Ind. Y1	5.30		Irvin, Pa. C3	5.30	Weirton, W.Va. W6	4.80	Trenton, N.J. (13) R5
Kokomo, Ind. C16	4.50	Mansfield, O. E6	4.80		Irvin, Pa. C3	5.30	West Leechburg, Pa. A4	3.25	Wallingford, Conn. W2
MartinsFerry, O. W10	4.40	Middleton, O. A10	4.80		Irvin, Pa. C3	5.30	Youngstown C3, Y1	3.25	Weirton, W.Va. W6
Niles, O. N12	4.40	Niles, O. R2	4.80		Irvin, Pa. C3	5.30	Youngstown C8	3.25	Youngstown C8, Y1
Pittsburg, Calif. C11	5.15	SparrowsPoint, Md. B2	5.40		Irvin, Pa. C3	5.30	STRIP, Hot-Rolled Alloy		STRIP, Cold-Rolled, High-strength Low-Alloy
SparsrowsPoint, Md. B2	4.40	Weirton, W.Va. W6	4.80		Irvin, Pa. C3	5.30	Bridgept, Conn. (10) S15	5.10	Cleveland A7, J5
Steubenville, O. W10	4.40	Yorkville, O. W10	17.50		Irvin, Pa. C3	5.30	Carnegie, Pa. S18	5.10	Dover, O. G6
Torrance, Calif. C11	5.15	SHEETS, Enam'lg. Iron, No. 12			Irvin, Pa. C3	5.30	Fontana, Calif. K1	6.30	Ecorse, Mich. G5
Weirton, W.Va. W6	4.40	Ashland, Ky. (8) A10	4.40		Irvin, Pa. C3	5.30	Ind. Harbor, Ind. I-2, Y1	3.25	Follansbee, W.Va. F4
SHEETS, Galvanized No. 10, High-Strength Low-Alloy		MANUFACTURING TERNES (Special Coated)			Irvin, Pa. C3	5.30	KansasCity, Mo. S5	5.70	Lackawanna, N.Y. B2
Irvin, Pa. C3	6.75	Fairfield, Ala. T2	6.75		Irvin, Pa. C3	5.30	NewBritain (10) S15	5.10	New Britain, Conn. A7, D2
SparrowsPoint, Md. B2	6.75	Gary, Ind. C3	6.65		Irvin, Pa. C3	5.30	Sharon, Pa. S3	5.10	Sharon, Pa. S3
SHEETS, Galvannealed Steel		Ind. Harbor, Ind. I-2	6.65		Irvin, Pa. C3	5.30	Youngstown C3	5.10	Youngstown C8
Canton, O. R2	4.95	Irvin, Pa. C3	6.65		CANMAKING BLACK PLATE (Base Box)		STRIP, Cold-Rolled Alloy Steel		STRIP, Cold-Rolled, High-strength Low-Alloy
Irvin, Pa. C3	4.95	Weirton, W.Va. W6	6.65		Aliquippa, Pa. J5	\$5.75	Bridgept, Conn. (10) S15	5.10	Cleveland A7, J5
Kokomo, Ind. C16	5.05	Yorkville, O. W10	6.65		Fairfield, Ala. T2	5.85	Carnegie, Pa. S18	5.10	Dover, O. G6
Niles, O. N12	4.95	SHEETS, Lt. Coated Terne, 6 lb			Gary, Ind. C3	5.75	Fontana, Calif. K1	6.30	Ecorse, Mich. G5
SHEETS, Zincgrip No. 10		Gary, Ind. C3	5.75		GraniteCity, Ill. G4	5.95	Ind. Harbor, Ind. I-2	4.40	Follansbee, W.Va. F4
Butler, Pa. A10	4.65	Ind. Harbor, Ind. I-2	6.65		Ind. Harbor, Ind. Y1	5.75	KansasCity, Mo. S5	5.70	Lackawanna, N.Y. B2
Middleton, O. A10	4.65	Irvin, Pa. C3	6.65		Irvin, Pa. C3	5.75	NewCastle, Pa. B4	5.50	New Britain, Conn. A7, D2
SHEETS, Electro Galvanized		Weirton, W.Va. W6	6.65		Irvin, Pa. C3	5.75	NewYork W3	5.50	Sharon, Pa. S3
Cleveland R2	5.15	Yokville, O. W10	8.95		Irvin, Pa. C3	5.75	Pittsburg J5	3.25	SparsrowsPoint, Md. B2
Niles, O. R2	5.15	SHEETS, Coated Terne, 12 lb			Irvin, Pa. C3	5.75	Pittsburg, Calif. C11	6.50	Weirton, O. R2
Weirton, W.Va. W6	5.00	Gary, Ind. C3	8.95		Irvin, Pa. C3	5.75	Pittsburg, Calif. C11	6.50	Weirton, W.Va. W6
SHEETS, Zinc Alloy		Irvin, Pa. C3	8.95		Irvin, Pa. C3	5.75	SparsrowsPoint, Md. B2	5.85	Youngstown C8
Ind. Harbor, Ind. I-2	5.05	SHEETS, Long Terne, Ingot Iron			Irvin, Pa. C3	5.75	Weirton, W.Va. W6	5.75	STRIP, Electro Galvanized
		Middleton, O. A10	5.20		Irvin, Pa. C3	5.75	Youngstown C8	5.20	Weirton, W.Va. W6
TIN PLATE, Electrolytic (Base Box)	0.25	0.50	0.75		TIN PLATE, American 1.25 1.50 Coke (Base Box)	lb	STRIP, Cold-Finished, Spring Steel (Annealed)	0.25-0.40	0.40-0.60-0.80-1.05
	lb	lb	lb		Aliquippa, Pa. J5	\$7.00	Bridgept, Conn. (10) S15	5.90	Bridgept, Conn. (10) S15
Aliquippa, Pa. J5	\$6.45	\$6.70	\$7.00		Fairfield, Ala. T2	7.60	Carnegie, Pa. S18	5.90	Carnegie, Pa. S18
Fairfield, Ala. T2	6.55	6.80	7.10		Gary C3	7.50	Fontana, Calif. K1	6.30	Fontana, Calif. K1
Gary, Ill. C3	6.45	6.70	7.00		GraniteCity, Ill. G4	7.95	Ind. Harbor, Ind. I-2	4.40	Ind. Harbor, Ind. I-2
GraniteCity, Ill. G4	6.65	6.90	7.20		Ind. Harb. I-2, Y1	7.50	KansasCity, Mo. S5	5.70	KansasCity, Mo. S5
Ind. Harbor, Ind. I-2, Y1	6.45	6.70	7.00		Irvin, Pa. C3	7.50	NewCastle, Pa. B4	5.50	NewCastle, Pa. B4
Irvin, Pa. C3	6.45	6.70	7.00		Irvin, Pa. C3	7.50	NewYork W3	5.80	NewYork W3
Niles, O. R2	6.45	6.70	7.00		Pitts., Cal. C11	8.25	Pawtucket, R.I. N8	9.50	Pawtucket, R.I. N8
Pittsburg, Calif. C11	7.20	7.45	7.75		Sp.Pt., Md. B2	7.60	Cleve., or Pitts. Base	4.55	Cleve., or Pitts. Base
SparrowsPoint, Md. B2	6.55	6.80	7.10		Warren R2	7.50	Worcester, Mass. B5	4.50	Worcester, Mass. B5
Weirton, W.Va. W6	6.45	6.70	7.00		Yorkville, O. W10	7.50	Sharon, Pa. S3	4.00	Sharon, Pa. S3
Yorkville, O. W10	6.45	6.70	7.00		STRIP, Hot-Rolled Ingot Iron		Trenton, N.J. R5	6.30	Trenton, N.J. R5
TIN PLATE, American 1.25 1.50 Coke (Base Box)					Ashland, Ky. (8) A10	3.50	Wallingford, Conn. W2	4.50	Wallingford, Conn. W2
					Warren, O. R2	3.85	Weirton, W.Va. W6	4.00	Weirton, W.Va. W6
					Warren, O. R2	4.60	Youngstown C8	4.50	Youngstown C8
COILS AND CUT LENGTHS, Cold-Rolled, Silicon	Field	Arm.	Elec.	Motor	Dyn.				
Vandergrift, Pa. C3	5.70	6.20	6.95	7.75					
Warren, O. R2	5.40	5.70	6.20	6.95	7.75				
SHEETS, Silicon Transformer Grade	72	65	58	52					
BeechBottom, W.Va. W10	8.05	8.60	9.30	10.10					
Brackenridge, Pa. A4	8.05	8.60	9.30	10.10					
Follansbee, W.Va. F4	8.05	8.60	9.30	10.10					
Toronto, O. F4	8.05	8.60	9.30	10.10					
Vandergrift, Pa. C3	8.05	8.60	9.30	10.10					
Warren, O. R2	8.05	8.60	9.30	10.10					
Zanesville, O. A10	8.05	8.60	9.30	10.10					
COLD-REDUCED COILS and Cut Lengths, Silicon	72	T-100	T-90	T-80					
Butler, Pa. A10	12.35	13.60	14.85						
Vandergrift, Pa. C3	8.30	11.35	12.60	13.85					
Warren, O. R2	8.30	...	...	...		

Key to Producing Companies

A1	Acme Steel Co.	C10	Colorado Fuel & Iron	G4	Granite City Steel Co
A3	Alan Wood Steel Co.	C11	Columbia Steel Co.	G5	Great Lakes Steel Co
A4	Allegheny Ludlum Steel	C12	Col. Steel & Shafting Co.	G6	Greer Steel Co.
A6	American Shim Steel Co.	C13	Columbia Tool Steel Co.	H1	Hanna Furnace Corp
A7	American Steel & Wire	C14	Compressed Steel Shaft.	H4	Hesspenstall Co.
A8	Anchor Drawn Steel Co.	C16	Continental Steel Corp.	H6	Hind Steel Co. Inc.
A9	Angell Nail & Chaplet	C17	Copperweld Steel Co.	I-1	Igoe Bros. Inc.
A10	Armco Steel Corp.	C18	Crucible Steel Co.	I-2	Inland Steel Co.
A11	Atlantic Steel Co.	C19	Cumberland Steel Co.	I-3	Interlake Iron Corp.
B2	Bethlehem Steel Co.	C20	Cuyahoga Steel & Wire	J1	Jackson Iron & Steel
B3	Beth. Pac. Coast Steel	D2	Detroit Steel Corp.	J3	Jessop Steel Co.
B4	Blair Strip Steel Co.	D3	Detroit Tube & Steel Co.	J4	Johnson Steel & Wire
B5	Bliss & Laughlin Inc.	D4	Disston & Sons, Henry	J5	Jones & Laughlin Ste
B6	Boardi Steel Corp.	E1	Eastrn. Gas&Fuel Assoc.	J7	Judson Steel Corp.
B8	Braeburn Alloy Steel Co.	E2	Eastern Stainless Steel	K1	Kaiser Steel Corp.
B11	Buffalo Bolt Co.	E4	Electro Metallurgical Co.	K2	Keokuk Electro-Meta
B14	A. M. Byers Co.	E5	Elliott Bros. Steel Co.	K3	Keystone Drawn Ste
C1	Calif. Cold-Rolled Steel	E6	Empire Steel Co.	K4	Keystone Steel & Wil
C3	Carnegie-Illinois Steel	F2	Firth Sterling Steel	K5	Kidd Drawn Steel Co.
C4	Carpenter Steel Co.	F3	Fitzsimons Steel Co.	L1	Laclede Steel Co.
C5	Central Iron & Steel Div.	F4	Follansbee Steel Corp.	L2	LaSalle Steel Co.
	Barium Steel Corp.	F6	Fretz-Moon Tube Co.	L3	Latrobe Electric Stee
C7	Clev. Cld. Roll. Mills Co.	G1	Geneva Steel Co.	L5	Lockhart Iron & Stee
C8	Cold Metal Products Co.	G2	Globe Iron Co.	L6	Lone Star Steel Co.
C9	Colonial Steel Co.				

P, Hot-Rolled, High-Strength Low-Alloy	Cleveland A7 7.70	WIRE, Merchant Quality	WOVEN FENCE, 9-15½ gage
Temer, Ala. T2 4.95	Fostoria, O. S1 7.70	(6 to 8 gage) An'l. Galv.	Johnstown, Pa. E2 103
eland J5 4.95	Johnstown, Pa. B2 7.70	Ala. City, R2 4.80	Joliet, Ill. A7 103
se, Mich. G6 5.15	Kokomo, Ind. C16 7.70	Aliquippa J5 4.80	Kansas City, Mo. S5 115
feld, Ala. T2 4.95	Portsmouth, O. P12 7.70	Atlanta A11 4.95	Kokomo, Ind. C16 105
ana, Cal. K1 6.64	Struthers, O. Y1 7.70	Barterville, (19) K4 4.80	Albuquerque, Pa. 9-14½ ga. J5 109
Ind. C3 4.95	Trenton, N.J. R5 8.50	Cleveland A7 4.80	Atlanta A11 111
Harb, Ind. I-2, Y1 4.95	Waukegan, Ill. A7 7.70	Crawfurdville, M8 4.95	Bartonville, Ill. (19) K4 109
cawanna, N.Y. B2 4.95	Worcester, Mass. A7, T6.8.00	Donora A7 4.80	Crawfordsville, Ind. M8 112
sburgh, J5 4.95		Duluth A7 4.80	Donora, Pa. A7 109
on, Pa. S3 4.95		Fairfield T2 4.80	Duluth A7 109
ron, O. R2 4.95		Houston, Tex. S5 5.20	Houston, Tex. S5 117
ton, W.Va. W6 4.95		Johnstown B2 4.80	Fairfield, Ala. T2 109
ngstown C3, Y1 4.95		Joliet, Ill. A7 4.80	Johnstown, Pa. B2 109
NT COOPERAGE HOOP		Kokomo, Ind. C16 4.90	Johnston, 17ga, 6" B2 183
nt A11 3.60		Kansas City, Mo. S5 5.40	Johnston, 17ga, 4" B2 186
erdale, Ill. A1 3.60		Los Angeles B3 5.75	Joliet, Ill. A7 109
on, Pa. S3 3.60		Minnequa, C10 5.15	Kansas City, Mo. S5 121
ngstown C3 3.60		Moneses P7 4.80	Kokomo, Ind. C16 111
E, MB Spring, High-Carbon		Pitts, Cal. C11 5.75	Minnequa, Colo. C10 116
uppa, Pa. J5 5.55		Portsmouth, (18) P12 4.80	Moneses, Pa. P7 109
Ind. (11) L1 5.55		Rankin A7 4.80	Pittsburgh, Calif. C11 132
onville, Ill. (19) K4 5.55		So. Chicago R2 4.80	Portsmouth, O. (18) P12 109
el W12 5.55		So. S. Fran. C10 5.75	Rankin, Pa. A7 109
land, A7 5.55		SparrowsPt. B2 4.90	So. Chicago, Ill. R2 109
ca, Pa. A7 5.55		Sterling, Ill. (1) N15 4.80	Sterling, Ill. (1) N15 109
th A7 5.55		Struthers, O. Y1 4.80	
aria, O. S1 6.05		Torrance, Cal. C11 5.75	
town, Pa. B2 5.55		Worcester A7 5.10	
le, B3 6.50		WIRE, Upholstery Spring	
essen, Pa. P7 5.55		Aliquippa, Pa. J5 5.20	
ner, Mass. W12 5.85		Alton, Ill. (1) L1 5.20	
sburgh, Calif. C11 6.50		Duluth A7 5.20	
smouth, O. P12 5.55		Donora, Pa. A7 5.20	
icago, Ill. R2 5.55		Duluth A7 5.20	
rrowsPoint, Md. B2 5.65		Johnstown, Pa. B2 5.20	
thers, O. Y1 5.55		Los Angeles B3 6.15	
nton, N.J. A7 5.85		New Haven, Conn. A7 5.50	
ton, N.J. R5 6.35		Pittsburgh, Calif. C11 6.15	
kegan, Ill. A7 5.55		Portsmouth, O. P12 5.20	
ester A7, J4, T6, W12.5.85		So. Chicago, Ill. R2 5.20	
E, Cold-Rolled Flat		SparrowsPoint, Md. B2 5.20	
ago T6 5.35		Struthers, O. Y1 5.20	
land A7 5.00		Torrance, Calif. C11 6.15	
er, O. G6 5.00		Torrance, Calif. C11 6.15	
aria, O. S1 5.50		Waukegan, Ill. A7 5.20	
omo, Ind. C16 5.00		Worcester, Mass. A7, T6.4.45	
sillon, O. R8 5.00	WIRE (16 gage)	An'l. Galv.	
essen, Pa. P7 5.00		Stone Stone	
uckett, R.I. (11) N8 5.55		WIRE, Barbed	Col.
uckett, R.I. (12) N8 5.55			
ton, N.J. R5 5.80		Aliquippa, Pa. J5 5.20	
ester, Mass. A7 5.30		Alton, Ill. (1) L1 5.20	
Mass. T6 5.30		Duluth A7 5.20	
E, Fine and Weaving in. Coils		Donora, Pa. A7 5.20	
tonville, Ill. (19) K4 7.70		Duluth A7 5.20	
ago W13 7.70		Johnstown, Pa. B2 5.20	
E, WIRE		Los Angeles B3 6.15	
tonville, Ill. K4 7.10	Mild	Minnequa, Colo. C10 5.55	
eland A7 7.50	Plow	Moneses, Pa. P7 5.20	
eria, Pa. A7 7.50	Plow	Portsmouth, O. P12 5.20	
aria, O. S1 8.00	Plow	Rankin, Pa. A7 5.20	
omo, Ind. C16 5.00	Plow	So. Chicago, Ill. R2 5.20	
sillon, O. R8 5.00	Plow	So. San Fran., Calif. C10 5.20	
essen, Pa. P7 5.00	Plow	SparrowsPoint, Md. B2 5.20	
uckett, R.I. (11) N8 5.55	Plow	Sterling, Ill. (1) N15 5.20	
uckett, R.I. (12) N8 5.55	Plow	Struthers, O. Y1 5.20	
ton, N.J. R5 5.80	Plow	Torrance, Calif. C11 6.15	
ester, Mass. A7 5.30	Plow	Torrance, Calif. C11 6.15	
Mass. T6 5.30	Plow	Waukegan, Ill. A7 5.20	
E, Fine and Weaving in. Coils		Worcester, Mass. A7, T6.4.45	
tonville, Ill. (19) K4 7.70	WIRE, Barbed	Col.	
ago W13 7.70	WIRE, Barbed		
FENCE POSTS			
	Col.		
FENCE POSTS			
	Col.		
RAILS			
	Std. No. 1	Std. No. 2	Std. No. 2
	Std. No. 1	Std. No. 2	60 lb. Under
Bessemer, Pa. C3 3.20	Albuquerque, Pa. J5 3.10	3.15	3.55
Ensley, Ala. T2 3.20	Bartonville, Ill. (19) K4 3.10	3.15	3.55
Fairfield, Ala. T2 3.20	Atlanta A11 3.10	3.15	3.55
Gary, Ind. C3 3.20	Cleveland A9 3.10	3.15	3.55
Ind. Harbor, Ind. I-2 3.20	Crawfordsville M8 3.10	3.15	3.55
Johnstown, Pa. B2 3.20	Duluth A7 3.10	3.15	3.55
Lackawanna, N. Y. B2 3.20	Johnstown, Pa. B2 3.20	3.10	3.55
Minnequa, Colo. C10 3.20	Kokomo, Ind. C16 3.20	3.10	3.55
Steelton, Pa. B2 3.20	Minnequa, Colo. C10 3.20	3.10	3.55
TRACK BOLTS (20) Treated			
Fairfield, Ala. T2 8.50			
Lebanon, Pa. B2 8.50			
Minnequa, Colo. C10 8.50			
Pittsburgh, Pa. O3, P14 8.50			
STANDARD TRACK SPIKES			
Fairfield, Ala. T2 5.35			
Ind. Harbor, Ind. I-2, Y1 5.35			
Lebanon, Pa. B2 5.35			
Minnequa, Colo. C10 5.35			
Pittsburgh J5 5.35			
So. Chicago, Ill. R2 5.35			
SparrowsPoint, Md. B2 5.30			
Worcester, Mass. A7 5.50			
NAILS & STAPLES, Non-Stock			
Alabama City, Ala. R2 5.20			
Bartonville, Ill. (19) K4 5.20			
Ind. Harbor, Ind. I-2 5.20			
Johnstown, Pa. B2 5.20			
Lackawanna, N. Y. B2 5.20			
Minnequa, Colo. C10 5.20			
Steelton, Pa. B2 5.20			
TRACK BOLTS (20) Treated			
Fairfield, Ala. T2 8.50			
Lebanon, Pa. B2 8.50			
Minnequa, Colo. C10 8.50			
Pittsburgh, Pa. O3, P14 8.50			
STANDARD TRACK SPIKES			
Fairfield, Ala. T2 5.35			
Ind. Harbor, Ind. I-2, Y1 5.35			
Lebanon, Pa. B2 5.35			
Minnequa, Colo. C10 5.35			
Pittsburgh J5 5.35			
So. Chicago, Ill. R2 5.35			
SparrowsPoint, Md. B2 5.30			
Worcester, Mass. A7 5.50			
NAILS & STAPLES, Stock (To Consumers)			
Alabama City, Ala. R2 103			
Albuquerque, Pa. J5 103			
Atlanta A11 103			
Bartonville, Ill. (19) K4 103			
Johnstown, Pa. B2 103			
Lackawanna, N. Y. B2 103			
Minnequa, Colo. C10 103			
Steelton, Pa. B2 103			
LIGHT RAILS, Rail Steel			
Huntington, W.Va. W7 3.55			
Williamsport, Pa. S19 3.55			
TOOL STEEL			
Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	19.00	18W, 4Cr, 3V	114.50
Extra Carbon	22.00	18W, 4Cr, 2V, 9Co	168.50
Spec. Carbon	26.50	18W, 4Cr, 2V, 6Co	154.00
Oil Hardening	29.00	18.25W, 4.25Cr, 1V, 4.75Co	142.00
H1-Carbon-Cr	52.00	20.25W, 4.25Cr, 1.6V, 12.25Co	266.50
Cr Hot Wrk.	29.00	1.5W, 4Cr, 1V, 8.5Mo	65.00
18W, 4Cr, 1V	90.50	6.4W, 4.5Cr, 1.9V, 5Mo	69.50
18W, 4Cr, 2V	102.50	6W, 4Cr, 3V, 6Mo	88.00
Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, R2, S8, T7, U4, V2, V3.			
(1) Chicago Base. (2) Angles.		(15) 1½" and thinner.	
(3) Merchant. (4) Reinforcing.		(16) 40 lb and under.	
(5) Philadelphia del.		(17) Flats only.	
(6) Chicago or Birm. Base.		(18) To dealers.	
(8) 16 gage and heavier.		(19) Chicago & Pittsburgh Base.	
(9) 6" and narrower.		(20) Deduct 0.25c for untreated.	
(10) Pittsburgh Base.		(21) New Haven, Conn. Base.	
(11) Cleveland & Pittsburgh Base.		(22) Del. San Fran. Bay area.	
(12) Worcester, Mass. Base.		(23) Angles 1" x 1" to 1½" x 1¼" only.	
(13) 3" & wider; over ½" to 5.50c.		(24) Deduct 0.35c for finer than 15 Ga.	
(14) Also wide flange beams.			

STANDARD PIPE, T. & C.

BUTTWELD	Size	List	Pounds	Carload Discounts from List, %					
				Block	Galvanized				
1/8	5.5c	0.24	41.5	39.5	38.5	13.5	11.5	10.5	
1/4	6.0	0.42	39.5	37.5	36.5	15.5	13.5	12.5	
5/8	6.0	0.57	36	34	33	12.5	10.5	9.5	
1/2	8.5	0.85	43	41	42	26.5	24.5	25.5	
7/8	11.5	1.13	46	44	45	30.5	28.5	29.5	
1	17.0	1.68	48.5	46.5	47.5	33.5	31.5	32.5	
1 1/4	23.0	2.28	49	47	48	34	32	33	
1 1/2	27.5	2.73	49.5	47.5	48.5	34.5	32.5	33.5	
2	37.0	3.68	50	48	49	35	33	34	
2 1/2	58.5	5.82	50.5	48.5	49.5	35.5	33.5	34.5	
3	76.5	7.62	50.5	48.5	49.5	35.5	33.5	34.5	

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. 1/2-%"; F6; Benwood, W. Va. 1/2 percentage point lower on 1/2", 2 points lower on 1/4", 3 points lower on 1/8"; W10; Wheatland, Pa., 2 points lower on 1/4" through 1/2"; W9. Following make 1/2" through 3" only: Lorain, O. N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on 1/2" through 3".

Columns B & E: Sparrows Point, Md. B2; Wheatland, Pa., 1/2 through 1/2"; W9.

Columns C & F: Alto, Ill. (Lorain, O. Base) LI; Indiana Harbor, Ind., 1/2 through 3"; Y1.

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., 1/2 through 1/2"; F6; Benwood, W. Va., except 3 1/2 points lower on 1/2", 2 1/2 pts on 1/4", 3 pts on 1/8"; W10; Wheatland, Pa., except 2 pts lower on 1/4" through 1/2"; W9. Following make 1/2" through 3" only: Lorain N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on 1/2" through 3".

SEAMLESS AND ELECTRIC WELD											
Size	List	Pounds	Carload Discounts from List, %						Elec. Weld		
			Black	Seamless	Galv.	Black	Galv.	A	B	C	D
2	37.0c	3.68		33.5	23	38.5	23				
2 1/2	58.5	5.82	41.5	26	41.5	26					
3	76.5	7.62	41.5	26	41.5	26					
3 1/2	92.0	9.20	43.5	23	43.5	23					
4	\$1.09	10.89	43.5	28	43.5	28					
5	1.48	14.81	43.5	28	43.5	28					
6	1.92	19.18	43.5	28	43.5	28					

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

STAINLESS STEEL

Type	Sheets	Strip	Bars		
			Wire	Structurals	C.R.
301	37.50	30.50	28.50		
302	37.50	33.00	28.50		
303	39.50	36.50	31.00		
304	39.50	35.00	30.00		
309	52.00	41.50			
316	53.00	46.00			
321	45.50	44.50	34.00		
347	50.00	48.50	38.50		
410	33.00	27.00	23.00		
416	33.50	33.50	23.50		
420	40.50	43.50	28.50		
430	35.50	27.50	23.50		
501	24.00	22.50	11.50		
502	25.00	23.50	12.50		

Baltimore, Types 301 through

347 sheets, except 309 E2

Baltimore, bars, wire and

structurals A10

Brackenridge, Pa., sheets A4

Bridgeville, Pa., bars, wire,

sheets & strip, except Type

309 strip quoted 51.00c U4

Butler, Pa., sheets and strip

except Types 309, 501 &

502 A10

Carnegie, Pa., strip except

Type 416; Type 309 strip

quoted 51.00c S18

Cleveland, strip, except Type

309 quoted 51.00c, and ex-

cept Type 416 A7

Detroit, strip, except Type

309 quoted 51.00c M1

Dunkirk, N.Y., bars, wire A4

Duquesne, Pa., bars C3

Gary, Ind., sheets except

Type 416 C3

Harrison, N.Y., strip C18

Massillon, all products, ex-

cept Type 309 bars, wire &

structurals quoted 42.00c,

Type 501 10.50c, Type 502

11.50c R2

McKeesport, Pa., bars, sheets

except Type 416, C3

McKeesport, Pa., bars & wire

except Types 301, 309, 501

& 502; strip Types 410 &

430 only F2

Middletown, O., sheets and

strip, except Types 501

and 502 and except 309

strip quoted 51.00c A10

Midland, sheets & strip C18

Munhall, Pa., bars C3

Pittsburgh, sheets C18

Reading, Pa., bars & strip

except Type 309 bars quoted

42.00c, C4

So., Chicago, Ind., bars &

structurals C3

Syracuse, N.Y., bars, wire &

structurals C18

Titusville, Pa., bars U4

Wallingford, Conn., strip W2

Washington, Pa., bars, sheets

& strip except Type 309

strip quoted 51.00c J3

Washington, Pa., Types 301

through 347 sheets & strip

except 303 & 309; 316 sheets

58.00c strip 60.00c W4

Watervliet, N.Y., structurals & bars A4

Waukegan, bars & wire A7

West Leechburg, Pa., strip, except Type 309 quoted

51.00c A4

Youngstown, strip C8.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

—Inches

Diam.

Length

Cents per lb.

17.18, 20

60.72

16.00

8 to 16

48.60, 72

16.50

7

48.60

17.75

6

48.60

19.00

4.5%

40

19.50

3

40

20.50

2 1/2

24.30

23.00

CARBON

40

100.110

7.50

35

100.110

7.50

30

84.110

7.50

24

72 to 104

7.50

17 to 20

84.90

7.50

14

60.72

8.00

10.12

60

8.25

FLUORSPAR

Metalurgical grade, f.o.b.

shipping point, in Ill., Ky.,

net tons, carloads, effective

CaF₂ content, 70% or more,

\$37; less than 60%, \$34.

Imported, net ton, duty paid,

metallurgical grade, \$39-\$40.

REFRACTORIES

(Prices per 1000 brick,

f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Van-

dal, Farber, Mexico, Olive

Hill, Clearfield, or Curwens-

ville, Pa., Ottawa, Ill., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Miss.,

Orville, Mo., \$80.

Intermediate Heat Duty: St.

Louis, or Vicksburg, Mo.,

Orville, Mo., \$80.

Low-heat Duty: Oak Hill, or

Portsmouth, O., Clearfield,

or Curwensville, Pa., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Miss.,

Orville, Mo., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Mo.,

Orville, Mo., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Mo.,

Orville, Mo., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Mo.,

Orville, Mo., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Mo.,

Orville, Mo., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Mo.,

Orville, Mo., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Mo.,

Orville, Mo., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Mo.,

Orville, Mo., \$80.

High-heat Duty: Salina, Pa.

\$85; Woodbridge, N. J., St.

Louis, or Vicksburg, Mo.,

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

SHEETS			STRIP			BARS			Standard Structural Shapes		PLATES	
H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy	41408	Carbon	Floor		
York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36	
York (c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16	
on (city)	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45	
on (c'try)	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25	
a. (city)	5.90	6.49	6.88	5.65	...	5.65	6.21	8.10	5.35	5.60	6.80	
a. (c'try)	5.65	6.24	6.63	5.40	...	5.40	5.96	7.85	5.10	5.35	6.55	
(city)	5.46	6.36	6.81	5.52	...	5.57	6.05	...	5.51	5.71	7.16	
(c'try)	5.31	6.21	6.66	5.37	...	5.42	5.91	...	5.36	5.56	7.01	
folk, Va.	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
h. (w'hse)	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
alo (del.)	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06	
alo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91	
l. (w'hse)	4.85	5.75**	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55	
oil (w'hse)	5.32	6.22**	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02	
eland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81	
e. (w'hse)	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66	
in. (w'hse)	5.27‡	5.94**	6.83	5.39	6.10	5.44	5.95	...	5.44	5.64	7.05	
ago (city)	5.05	5.95	7.05	5.05	6.35-6.85	5.10	5.60	7.90	5.10	5.30	6.75	
ago (w'hse)	4.85	5.75	6.85	4.85	6.15-6.65	4.90	5.40	7.70	4.90	5.10	6.55	
auke (city)	5.18	6.08	7.18	5.18	6.48-6.98	5.23	5.78	8.03	5.23	5.43	6.88	
au. (c'try)	5.03	5.93	7.03	5.03	6.33-6.83	5.08	5.63	7.88	5.08	5.28	6.73	
Louis (del.)	5.37	6.27	7.44	5.34	6.64	5.39	6.19	6.64	5.39	5.59	7.04	
L. (w'hse)	5.22	6.12	7.29	5.19	6.49	5.24	6.04	6.49	5.24	5.44	6.89	
ham (city)	5.00	5.90	6.55	5.00	...	5.00	6.83	...	5.05	5.25	6.69	
ham (c'try)	4.85	5.75	6.40	4.85	...	4.85	6.68	...	4.90	5.10	7.54	
ha. Nebr.	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83	
Ang. (city)	5.60	7.15	7.60	6.10	7.75	5.75	7.40	...	5.60	5.65	7.90	
Ang. (w'hse)	5.45	7.00	7.45	5.95	7.60	5.60	7.25	...	5.45	5.50	7.75	
Francisco..	6.15 ¹⁰	7.50 ⁸	7.80	6.75 ¹⁰	8.25 ⁸	5.90 ¹⁰	7.55	10.85 ²	5.90	6.35	8.10	
Se-Tacoma	6.70 ¹⁰ ‡	8.15 ⁸	8.80	6.70 ⁷	...	6.20 ⁷	8.15 ⁸	10.10	6.00 ⁷	6.35 ⁷	8.40 ⁷	

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage a excluded); § as rolled; ** 17 gage; †† as annealed. Base quantities: 400 to 1999 lb except as noted; Cold-rolled strip, 2000 lb and over; cold-rolled bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; 1—1500 lb and over; 2—1000 to 4999 lb; 3—450 to 1499 lb; 4—400 to 1499 lb; 5—1000 to 1999 lb; 6—1000 lb and over; 7—300 to 999 lb; 8—1500 to 1999 lb; 9—400 to 3999 lb; 10—400 lb and over; 11—500 to 1499 lb.

LEADING FERROALLOY PRODUCTS

Manganese Alloys

geisen: (19-21% Mn, 1-3% Si) Carlot per ton, \$65, Palmerton, Pa.; \$66, Pittsburgh and Chicago; (16% to 19% Mn) \$1 per lower.

ard Ferromanganese: (Mn 78-82%, C 7% max.) Carload, lump, bulk \$172 per gross of alloy, c.l. packed, \$184; gross ton lots, \$199; less gross ton lots, packed, \$216. Alloy, W. Va., Niagara Falls, N. Y., Velland, Ont. Base price: \$174, f.o.b. Birmingham and Johnstown, Pa., furnaces; \$172, Eridan, Pa.; \$175, Etna, Pa. Shipment from five Coast warehouses by one seller add \$33 above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, \$214; less gross ton lots, f.o.b. Chicago. Add or subtract \$2.15 for 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Carbon Ferromanganese, Regular Grade: (80-85%). Carload, lump, bulk, max. % C, 24.75c per lb of contained Mn, carload packed 25.25c, ton lot 26.26c, less ton 27.8c. Deduct 0.5c for max. 0.15% C above from above prices, 1c for max. 0.30% C, for max. 0.50% C, and 4.5c for max. C—max. 7% Si. Special Grade: (Mn approx., C 0.07% max., P 0.06% max.). 0.5c to above prices. Spot, add 0.25c.

um-Carbon Ferromanganese: (Mn 80-85%, 5% max., Si 1.5% max.). Carload, lump, 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

anese Metal: (Mn 96% min., Fe 2% max., Si 1% max, C 0.20% max.). Carload, bulk, packed 35.5c per lb of metal, ton lot less ton 39c. Delivered. Spot, add 2c.

anese, Electrolytic: Less than 250 lb, 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 36,000 lb or more, 28c. Premium for oxygen-removed metal 1.5c per pound, f.o.b. Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

anganese: (Mn 65-68%). Contract, bulk, 1.50% C grade, 18-20% Si, 8.95c lb of alloy, carload packed, 9.70c, ton lot less ton 11.60c. Freight allowed. For C grade, Si 15-17.5%, deduct 0.2c from prices. Spot, add 0.25c.

Chromium Alloys

Carbon Ferrochrome: Contract, c.l., bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

High-Carbon Ferrochrome: (Cr 60-65%, 6-7% Mn 4-6%, C 4-6%). Add 1.1c to carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MXD, bulk 22.00c per lb of contained Cr, c.l. packed 22.9c, ton lot 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload. 1" x D; packed, max 0.50% C grade, \$1.03 per lb of contained chromium, ton lot \$1.05, less ton \$1.07. Delivered. Spot, add 0.25c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alisifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3 lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 1/2 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicormanganese Briquets: (Weighing approx. 3 1/2 lb and containing exactly 2 lb of Mn and approx. 1/2 lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2 1/2 lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybde-Oxide Briquets: (Containing 2 1/2 lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langethol, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

(Please turn to page 144)

Metal Markets Remain Unsettled

Lead drops 1/2-cent and antimony 6 1/2 cents a pound as large offerings of foreign metal depress markets. Straits spot available at 1/8-cent under RFC's selling price

New York—Nonferrous metal markets remain unsettled. Readjustments are still being made to meet increased foreign competition arising from devaluation of several currencies abroad. Trading in tin and zinc has been disrupted by the steel strike which has eliminated the principal user of each metal. The general price trend is still downward, latest price reductions having been posted in lead and antimony. Straits tin is now readily available for prompt delivery at 95.87 1/2c, New York, or 1/8-cent under the RFC asking price.

Lead—Prices dropped 1/2-cent a pound further last week to the basis of 13.55c, St. Louis. This represents a drop of 1 1/2 cents a pound since Sept. 26 when the downturn started. The latest price cut was necessary to stimulate buying so that bookings by custom smelters would balance their intake of ores, concentrates and scrap. Another factor is the increased tonnage of Mexican lead being offered here following devaluation of the pound sterling.

Effective Oct. 7, producers of lead sheet, pipe and oxides reduced their prices 1/2-cent a pound, while producers of pigments lowered prices 1/4-cent a pound on dry white lead and sublimed white lead and blue. Phelps Dodge Copper Products Corp. has established its lead factor for paper cable price schedule at minus 3.75.

Antimony—National Lead Co. reduced antimony prices 6.50 cents a pound, effective as of Oct. 7, to the basis of 32.00c a pound in bulk quantities at Laredo, Tex. The former price had been 38.50c a pound since Oct. 8, 1948, when the price was advanced 3.50 cents a pound.

Reduction in the antimony price is attributed to the heavy flow of foreign metal to this country at reduced prices. The metal has been coming from China, Belgium and England and is being offered to American users at prices ranging from 28.00c to 32.00c a pound.

Zinc—Slab zinc prices are steady on the basis of 9.25c, East St. Louis, for prime western. This level, established Oct. 3, is lowest since November, 1946, when OPA controls expired.

Deliveries of slab zinc to domestic consumers dropped to 60,220 tons in September from 68,659 in August, making the nine months' total 482,476 tons against 574,438 in like period a year ago. Exports and drawback increased to 3830 tons from 1212, while shipments on government account rose to 6027 tons from 4468. This brought total shipments of slab zinc to 70,077 tons in September compared with 74,339 in August.

Production declined to 70,392 tons last month from 73,819 in August, making the nine months' total 669,356

tons against 631,498 in the like 1948 period. Stocks of slab zinc at the end of September amounted to 85,203 tons compared with 84,888 at end of August. Unfilled orders on producers' books at end of last month amounted to only 35,009 tons against 41,336 at end of August and 87,898 at end of February, high for the year.

Tin—Sufficient quantity of Straits tin is offered on the outside market for prompt delivery to establish the going level at 95.87 1/2c, New York, 1/8-cent below Reconstruction Finance Corp.'s selling price. Private firms are booking practically all the business being done in tin, although the government agency is still making deliveries on old contracts. RFC will continue to cover needs of buyers unable to obtain tonnages on the outside market.

Pending resumption of free trading on the London Metal Exchange or settlement of the steel strike, consumers are expected to make only small, scattered commitments.

Copper—In contrast to activity in other major nonferrous metal markets, a substantial tonnage of copper is being booked for November, earliest delivery available. Buying is stimulated by desire of consumers to accumulate reserves as protection against a possible spread of strikes at refineries. Consumers are having difficulty in obtaining certain shapes, supply being sharply reduced by the strike at the Carteret, N. J., refinery. Undertone of the market is firm at 17.62 1/2c, delivered Connecticut, for electrolytic.

Deliveries of copper to domestic users increased to 103,115 tons from 90,739 tons in August and were the largest since last March. Crude copper production from primary sources held steady at 56,946 tons compared with 56,232 tons in the preceding month, while output from secondary sources increased to 7291 tons from 6337 tons in August. Production of refined copper declined about 5600 tons to 79,949 tons from 85,577 tons in August. In addition to the large domestic deliveries, 21,101 tons of copper were delivered into the government stockpile. Stocks of refined copper at the end of September amounted to 193,890 tons, a drop of 23,277 tons from the 217,167 tons reported at the end of August.

Aluminum—Permanente Metals Corp. reports that commercial sales of aluminum rose 60 per cent in September compared with the average for the previous three months. Henry J. Kaiser, president, said the rising demand for aluminum indicates an industrial and business upturn in view of the thousands of uses of the metal in manufacturing and in the construction, transportation and electric power industries. Beginning in

April and continuing to August, sales of aluminum declined substantially. Manufacturers who had maintained sizable inventories abruptly curtailed purchases below their requirements at that time. Permanente reduced production to less than 50 per cent of capacity in June, July and August compared with 100 per cent capacity operations in the like 1948 period.

Total primary aluminum production in the United States amounted to 54,184 tons in June, a decline of 10 per cent from May, says the Bureau of Mines. Output for the first nine months totaled 323,126 tons, an increase of more than 6 per cent over the 303,624 tons produced in the like 1948 period. Shipments of primary aluminum from reduction plants declined to 30,711 tons in June, the lowest in more than two years, and resulted in stocks rising to the highest level since September, 1947.

Aluminum Shipments Increase

New York—Shipments of aluminum sheet, plate and strip increased in August for the first time in nine months. This forms a basis for more optimistic outlook in the aluminum industry, says Donald M. White, secretary, Aluminum Association.

Shipments of these products totalled 47,892,491 pounds in August compared with 41,711,932 pounds in July, an increase of nearly 14 per cent. Production of primary aluminum totaled 104,009,815 pounds during August compared to 111,553,000 pounds the previous month.

"Preliminary estimates of shipments for September indicate a continuing upswing," Mr. White says. "Although we do not know how we can project gains into the future, orders in this month are expected to show a decided improvement from last month."

Canadian Lead Price Decline

Montreal—Consolidated Mining and Smelting Co. of Canada Ltd. reduced its lead price 1/2-cent a pound to 15.00c. This is the third cut since Canadian lead prices were boosted about 10 per cent following devaluation of the Canadian dollar and represents a net decline of 1.50 cent.

To Review ICC Switching Order

Washington—Supreme Court will review a lower court decision this week in an Interstate Commerce Commission order that two western railroads stop giving certain switching services to two large smelting firms.

ICC had ordered Denver & Grande Western Railroad and Union Pacific Railroad to stop giving switching services at American Smelting and Refining Co.'s plant at Leadville, Colo., and Garfield and Murray, Utah, and at United States Smelting, Refining & Mining Co.'s plant at Midway, Utah.

This is one of a long series of cases in which ICC has tried to keep railroads from performing certain switching and car spotting services for large customers.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

MARY METALS

Electrolytic: 17.62½c, Conn. Valley, 17.75c, Conn. Valley.
Ingots: 85-5-5-5 (No. 115) 15.50-16.50c; 0-2 (No. 215) 24.50c; 80-10-10 (No. 305) 0c; No. 1 yellow (No. 405) 13.25-14.25c.
Primes: Prime western 9.25c, brass special 9c, intermediate 9.75c, East St. Louis; grade 10.25c, delivered.
Common: 14.05c; chemical 14.15c; cor-14.15c, St. Louis.

Mary Aluminum: 99% plus, ingots 17.00c, 16.00c. Base prices for 10,000 lb and f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.00c; No. 12 foundry alloy (No. 2 grade) 15-15.75c; steel deoxidizing grades, notch granulated or shot: Grade 1, 17.25c; 2, 16.25c; grade 3, 15.25c; grade 4, 15c. Prices include freight at carload rate 75 cents per 100 lb.

titanium-aluminum alloy No. 1 (low Cu) 2c; No. 2 (2% Cu) 28.00c, f.o.b. Eddy-ville, Pa.

neum: Commercially pure (99.8%) stand-
ingots, 10,000 lb and over, 20.50c, f.o.b. port, Tex.

Straits and other Grade A tin, spot, 7½c, New York; Straits, October, 95.25c; Straits, November, 95.00c. Chinese tin, October, 87.00-88.00c. RFC selling prices for prompt delivery, ex-dock New York f.o.b. Texas City, Tex.: Grade A, 99.8% higher (including Straits) 96.00c; Grade B, 95% or higher, not meeting specs, for Grade with 0.05% max. arsenic, 95.80c; Grade C, 95-99.79% incl., 95.40c; Grade D, 99.5-99.9% incl., 95.40c; Grade E, 99-99.49% 95.00c; Grade F, 98-98.99% 94.50c; Grade G, 95-99% 92.00c. Prices for Grade D through Grade G are for tin content.

tin: American 99.99.8% and over but meeting specifications below, 32.00c; 99.8% over (arsenic 0.05% max); other impurities 0.1% max., 32.50c; f.o.b. Laredo, Tex., bulk shipments. Foreign, 99% (Chinese, Welsh, Belgian), prompt, 26.25c, New York.

Electrolytic cathodes, 99.9%, base sizes 40.00c; 25-lb pigs, 40.00c; "XX" nickel shot, 43.50c; "F" nickel or ingots, for addition to cast iron, 40c. Prices include import duty.

cur: Open market, spot, New York \$73- per 76-lb flask.

tinum-Copper: 3.75-4.25% Be, \$24.50 per contained Be.

tinum: "Regular" straight or flat forms, del.; special or patented shapes, \$2.15. **alt:** 97.98%, \$1.80 per lb for 550 lb (keg); 2 per lb for 100 lb (case); \$1.67 per lb for 100 lb.

U. S. Treasury: \$35 per ounce.

Open market, New York, 73.25c per ounce.

tinum: \$69-\$72 per ounce.

adium: \$24 per Troy ounce.

tinum: \$100-\$110 per Troy ounce.

tinum (sponge form): \$5 per pound.

MILLED, DRAWN, EXTRUDED PRODUCTS

COPPER AND BRASS
 Base prices, cents per pound, f.o.b. mill; based on 16-cent copper.)

et: Copper 31.30; yellow brass 28.19; commercial bronze, 95%, 31.28; 90%, 30.84; red 85%, 29.89; 80%, 29.47; best quality, 94%; nickel silver, 18%, 41.78; phosphor-bronze, grade A, 5%, 50.47.

es: Copper, hot rolled 27.15; cold drawn 20; yellow brass free cutting, 22.76; commercial bronze, 95% 30.97; 90% 30.53; red 85% 29.58; 80% 29.16.

less Tubing: Copper 31.34, yellow brass 20; commercial bronze 90% 33.50; red 85% 32.80; 80% 32.38.

es: Yellow brass 28.48; commercial bronze, 31.57; 90% 31.13; red brass, 85% 30.18; 29.76; best quality brass 29.30.

er Wire: Bare soft, f.o.b. eastern mills, 000 lb lots 22.42½, l.c.l. 23.05, c.l. 22.55; therproof, f.o.b. eastern mills, 100,000 lb 24.693, l.c.l. 25.443, c.l. 24.943; magnet, cored, 27.62½, 15,000 lb or more 27½, l.c.l. 28.37½.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	tin	Nickel	Silver
10-13	17.625	13.55	9.25	95.875	17.00	32.00	40.00	73.25
7-8	17.625	13.60	9.25	95.875	17.00	32.00	40.00	73.25
4-6	17.625	14.05	9.25	96.00	17.00	38.50	40.00	73.25
3	17.625	14.10	9.25	96.00	17.00	38.50	40.00	73.25
1	17.625	14.55	10.00	96.00	17.00	38.50	40.00	73.25
l. Avg.	17.625	14.853	10.058	101.654	17.00	38.500	40.000	73.202
4. Avg.	17.625	14.806	10.000	103.000	17.00	38.500	40.000	71.889
7 Avg.	17.279	13.335	9.346	103.000	17.00	38.500	40.000	71.500

TE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, the western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; tin, 99%, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery packed; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

ALUMINUM

Thickness	Widths or Range, Inches	Diameters, In. Incl.	Sheet Base*	Coiled Sheet Base	Sheet Circle Base
0.249-0.136	12-48	26.9	...	...	...
0.135-0.096	12-48	27.4	...	...	...
0.095-0.077	12-48	27.9	26.0	29.6	...
0.076-0.068	12-48	28.5	26.2	29.8	...
0.067-0.061	12-48	28.5	26.2	29.8	...
0.060-0.048	12-48	28.7	26.4	30.1	...
0.047-0.038	12-48	29.1	26.6	30.4	...
0.037-0.030	12-48	29.5	27.0	30.9	...
0.029-0.024	12-48	29.9	27.3	31.3	...
0.023-0.019	12-36	30.5	27.7	31.8	...
0.018-0.017	12-36	31.1	28.3	32.6	...
0.016-0.015	12-36	31.8	28.9	33.5	...
0.014	12-24	32.7	29.7	34.6	...
0.013-0.012	12-24	33.6	30.4	35.5	...
0.011	12-24	34.6	31.3	36.7	...
0.010-0.0095	12-24	35.6	32.3	38.0	...
0.009-0.0085	12-20	36.8	33.4	39.5	...
0.008-0.0075	12-20	38.1	34.6	41.1	...
0.007	12-18	39.5	35.9	42.9	...
0.006	12-18	41.0	37.2	47.0	...

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

SCREW MACHINE STOCK: 5000 LB AND OVER.

Diam. (in.)	Round	Hexagonal
across flats	R317-T4	17S-T4
0.125	48.0	...
0.156-0.203	41.0	...
0.219-0.313	38.0	...
0.344	37.0	47.0
0.375	36.5	48.5
0.406	36.5	44.0
0.438	36.5	45.5
0.469	36.5	44.0
0.500	36.5	45.5
0.531	36.5	44.0
0.563	36.5	41.5
0.594	36.5	41.5
0.625	36.5	43.0
0.656	36.5	41.5
0.688	36.5	41.5
0.750-1.000	35.5	40.5
1.063	35.5	39.0
1.125-1.500	34.5	39.0
1.563	34.5	37.5
1.625	33.5	36.5
1.688-2.000	33.5	36.5
2.125-2.500	32.5	36.5
2.625-3.375	31.5	36.5

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, \$18.75 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, \$18.75 per cwt. Traps and bends: List price plus 48%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

An-

	Copper	Lead	Zinc	Tin	Aluminum	tin	Nickel	Silver
10-13	17.625	13.55	9.25	95.875	17.00	32.00	40.00	73.25
7-8	17.625	13.60	9.25	95.875	17.00	32.00	40.00	73.25
4-6	17.625	14.05	9.25	96.00	17.00	38.50	40.00	73.25
3	17.625	14.10	9.25	96.00	17.00	38.50	40.00	73.25
1	17.625	14.55	10.00	96.00	17.00	38.50	40.00	73.25
l. Avg.	17.625	14.853	10.058	101.654	17.00	38.500	40.000	73.202
4. Avg.	17.625	14.806	10.000	103.000	17.00	38.500	40.000	71.889
7 Avg.	17.279	13.335	9.346	103.000	17.00	38.500	40.000	71.500

Plating Materials

Chrome Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 27.96c; oval 27.46c; cast 25.99c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ¼-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 2090 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c, f.o.b. Sewaren, N. J. On 100 or 350 drums only, 100 to 600 lb, 63.3c; 700 to 1900 lb, 60.9c; 2000 to 9900 lb, 59.1c; 10,000 lb and over, 58.00c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 40.50c, f.o.b. Cleveland; 39.25c, Detroit; 39.25c, Philadelphia.

Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 88.00c; 100 lb kegs, 89.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean	Rod	Clean
Heavy	14.62½	14.62½	13.87½
Yellow brass	12.00	11.75	11.00

	Clean	Heavy	Ends	Turnings
Copper	14.62½	14.62½	13.87½	12.87½
Yellow brass	12.00	11.75	11.00	12.75

	Commercial	Bronze
95%	13.62½	13.37½
90%	13.50	13.25

	Red brass	85%	80%
85%	13.25	13.00	13.12½
80%	13.00	12.75	12.25

	Best Quality (71-80%)	Muntz Metal
71-80%	12.87½	12.62½
80%	11.12½	10.87½

	Nickel, silver, 10%	Phos. bronze, A
10%	14.00	13.75
20%	16.37½	16.12½

	Naval brass
10%	11.62½

	Manganese bronze
10%	11.62½

BRASS INGOT MAKERS

BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 13.75; No. 2 copper 12.75; light copper 11.75; composition red brass 10.75; radiators 8.75; heavy yellow brass 8.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 13.75; No. 2 copper 12.75; light copper 11.75; refinery brass (60% copper) per dry copper content nom.

IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

STEELMAKING SCRAP COMPOSITE

Oct. 13	\$26.75
Oct. 6	27.25
Sept. 1949	26.07
Oct. 1948	43.25
Oct. 1944	16.50

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PHILADELPHIA

No. 1 Heavy Melt. Steel	\$25.00
No. 2 Heavy Melt. Steel	23.50
No. 1 Busheling	23.50
No. 1 Bundles	25.00
No. 2 Bundles	22.50
Machine Shop Turnings	17.00
Short Shovel Turnings	18.00
Mixed Borings, Turnings	16.00
Bar Crop and Plate	27.00
Punchings & Plate Scrap	27.00
Cut Structural	26.00
Elec. Furnace Bundles	25.00-25.50
Heavy Turnings	25.00
No. 1 Chemical Borings	26.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	\$18.50
No. 2 Heavy Melt. Steel	17.00
No. 1 Busheling	15.00-16.00
No. 1 Bundles	15.00-18.50
No. 2 Bundles	14.00-15.00
No. 3 Bundles	nominal
Machine Shop Turnings	10.00-11.00
Mixed Borings, Turnings	10.00-11.00
Short Shovel Turnings	11.00-12.00
Punchings & Plate Scrap	22.00-23.00
Cut Structural	22.00-23.00
Elec. Furnace Bundles	21.00

No. 1 Busheling	22
No. 2 Bundles	22
Machine Shop Turnings	15
Mixed Borings, Turnings	15
Short Shovel Turnings	15
Cast Iron Borings	15
Bar Crops and Plate	30
Cut Structural	26
Cast Iron Grades	26

PITTSBURGH

No. 1 Heavy Melt.	\$29.50-30.00
No. 2 Heavy Melt.	27.50-28.00
No. 1 Busheling	29.50-30.00
No. 1 Bundles	29.50-30.00
No. 2 Bundles	23.00-24.00
No. 3 Bundles	22.00-23.00
Heavy Turnings	22.50-23.50
Machine Shop Turnings	20.00†
Mixed Borings, Turnings	20.00†
Short Shovel Turnings	22.00
Cast Iron Borings	21.00*
Low Phos. Steel	31.00-32.00*

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
No. 1 Machinery Cast	39.00-40.00
Charging Box Cast	31.00-32.00*
Heavy Breakable Cast	28.00-29.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-32.50
Axes	36.00-37.00
Rails, Random Length	35.00-36.00
Rails, 2 ft and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	33.00-34.00
Angles, Splice Bars	33.00-34.00

* Nominal.

† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	\$26.50†
No. 2 Heavy Melt. Steel	25.50†
No. 1 Busheling	26.50†
No. 1 Bundles	26.50†
No. 2 Bundles	23.50†
Machine Shop Turnings	17.00†
Mixed Borings, Turnings	19.00†
Short Shovel Turnings	19.00†
Cast Iron Borings	19.00†
Bar Crops and Plate	27.50†
Punchings & Plate Scrap	27.50†
Cut Structural	29.50†

† Nominal.

Cast Iron Grades

No. 1 Cupola	40.00-41.00
Charging Box Cast	34.00-35.00
Stove Plate	35.00-36.00
Heavy Breakable Cast	32.00-33.00
Unstripped Motor Blocks	30.50-31.50
Malleable	34.00-35.00
Brake Shoes	31.00-32.00
Clean Auto Cast	42.00-43.00
No. 1 Wheels	35.00-36.00
Burnt Cast	32.00-33.00

† Nominal.

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-33.00
R.R. Malleable	34.00-35.00
Rails, 3 ft and under	38.00-39.00
Rails, Random Lengths	32.00-33.00
Cast Steel	27.00-28.00
Railroad Specialties	31.00-32.00
Uncut Tires	30.50-31.00
Angles, Splice Bars	34.00-35.00

VALLEY

No. 1 Heavy Melt. Steel	\$31.00-31.50
No. 2 Heavy Melt. Steel	30.00-30.50
No. 1 Bundles	31.00-31.50
No. 2 Bundles	27.00-27.50
Machine Shop Turnings	19.00-20.00
Short Shovel Turnings	22.00-23.00
Cast Iron Borings	22.00-23.00
Low Phos.	32.00-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.00-33.00
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BUFFALO

No. 1 Heavy Melt. Steel	\$28.00-28.50
No. 2 Heavy Melt. Steel	25.50-26.00
No. 1 Bushelings	25.50-26.00
No. 1 Bundles	27.50-28.00
No. 2 Bundles	24.00-24.50
Machine Shop Turnings	19.00-19.50
Mixed Borings, Turnings	20.00-20.50
Cast Iron Borings	20.00-20.50
Short Shovelings	21.50-22.00
Low Phos.	29.50-30.00

Cast Iron Grades

No. 1 Cupola	38.00-38.50
No. 1 Machinery	39.00-39.50
Mixed Yard	36.50-37.00
Malleable	35.50-36.00

Railroad Scrap

Rails, 3 ft. and under	36.00-37.00
Scrap rails	31.00-32.00
Specialties	32.00-33.00
No. 1 car wheels	33.00-34.00

ST. LOUIS

No. 1 Heavy Melt. Steel	\$28.00-29.00
No. 2 Heavy Melt. Steel	25.00-26.00
Machine Shop Turnings	21.00-22.00
Short Shovel Turnings	21.00-22.00
Cast Iron Grades	22

R.R. Malleable	31.00-32.00
Rails, Rerolling	38.00-39.00
Rails, Random Lengths	32.00-33.00
Rails, 3 ft. and under	36.00-38.00
Uncut Tires	28.00-29.00
Angles, Splice Bars	33.00-35.00

R.R. Malleable	31.00-32.00
Rails, Rerolling	38.00-39.00
Bushelings new factory, prep'd	11
Bushelings new factory, unprep'd	11
Short Steel Turnings	14
Cast Iron Grades	33.00-32

Cast	33.00-32
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* Removed from price con
Aug. 9, 1947; quoted on basis f.o.b. shipping point.

BIRMINGHAM

No. 1 Heavy Melt. Steel	\$25.00
No. 2 Heavy Melt. Steel	24.50

No. 1 Busheling	22
No. 2 Bundles	22
Mixed Borings, Turnings	15
Short Shovel Turnings	15
Cast Iron Borings	15
Bar Crops and Plate	30
Cut Structural	26
Cast Iron Grades	26

No. 1 Cupola Cast	30.00-31.00
No. 1 Machinery	32.00
Charging Box Cast	25.00-26.00
Heavy Breakable Cast	25.00-26.00
Unstripped Motor Blocks	26.00
Malleable	27.00-28.00
Cast Iron Grades	28

No. 1 Cupola Cast	30.00-31.00
Mixed Cast	27.00-28.00
Heavy Breakable Cast	18.00-20.00
Stove Plate	22.00-23.00
Unstripped Motor Blocks	20.00-21.00
Malleable	20
Cast Iron Grades	20

No. 1 Cupola Cast	41.00-42.00
Clean Auto Cast	41.00-42.00
No. 1 Wheels	33.00-34.00
Stove Plate	29.00-30.00
Railroad Scrap	20
No. 1 R.R. Heavy Melt.	31.00-32.00
Malleable	34.50-35.50
Rails, Rerolling	41.00-42.00
Rails, Random Lengths	34.50-35.50
Rails, 2 ft. and under	38.00-39.00
Rails, 18 in. and under	39.00-40.00
Railroad Specialties	33.00-34.00
Angles, Splice Bars	35.50-36.50
Cast Iron Grades	36

No. 1 Heavy Melt. Steel	\$28.00-29.00
No. 2 Heavy Melt. Steel	25.00-26.00
Machine Shop Turnings	21.00-22.00
Short Shovel Turnings	21.00-22.00
Cast Iron Grades	22
No. 1 Busheling	22
No. 2 Bundles	22
Mixed Borings, Turnings	15
Short Shovel Turnings	15
Cast Iron Borings	15
Bar Crops and Plate	30
Cut Structural	26
Cast Iron Grades	26

No. 1 Cupola Cast	36.00-38.00
Charging Box Cast	34.00-35.00
Heavy Breakable Cast	32.00-33.00
Brake Shoes	30.00-31.00
Clean Auto Cast	40.00-42.00
Burnt Cast	30.00-31.00
Railroad Scrap	30
No. 1 R.R. Heavy Melt.</	



The vertical mast and cross-arms of the Ward "Minute Man" antenna are made of J&L PERMA-TUBE. It takes just 60 seconds to remove the preassembled antenna from its box and swing all arms into position as shown here. PERMA-TUBE antennas combine strength, rigidity and rust-resistance—give longer trouble-free service—and better television reception.

J&L STEEL

PERMA-TUBE may be used for many applications where strength, rigidity, rust-resistance, and attractive appearance are necessary.

using the new exclusive rust-resistant J&L PERMA-TUBE for the vertical mast and cross-arms in the "Minute-Man" series of television antennas, Ward Products Corporation, Division of the Gabriel Company, Cleveland, Ohio, builds the following advantages:

- Greater structural rigidity with smooth, attractive appearance.
- Greater strength to resist ice loads.
- Clearer, steadier, television reception. Less vibration from wind.
- No mechanical seam in Perma-tube to invite rust which would

reduce the torsional strength.

4. Ease and speed of installation . . . at less cost.

J&L PERMA-TUBE is a light-wall, electricweld steel tubing, coated inside and out with an exclusive plastic-type, weather-resistant finish. PERMA-TUBE can be furnished: bent . . . expanded . . . flanged . . . swaged or fluted.

J&L PERMA-TUBE for television antennas, costs less than any other tubing with comparable strength, rigidity and rust-resistance.

J&L PERMA-TUBE is not only

applicable to television antennas, but also wherever strength, rigidity and rust-resistance are important. It is available in all regular sizes and shapes of J&L Electricweld Tubing and in lengths up to 10 feet. Return the coupon TODAY for complete information on this new J&L product.

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Pittsburgh 19, Pa.

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Do you recommend PERMA-TUBE for

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COMPANY _____

ADDRESS _____

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Sheets Strip . . .

Sheet and Strip Prices, Pages 119-120-121

New York—While most sheet sellers are reluctant to accept orders for shipment after the turn of the year, some are booking that far ahead. Tonnage for regular customers, until the strike is settled no definitive promises can be made, but most producers of cold-finished sheets and vanized must book for next year delivery if they are to book at all.

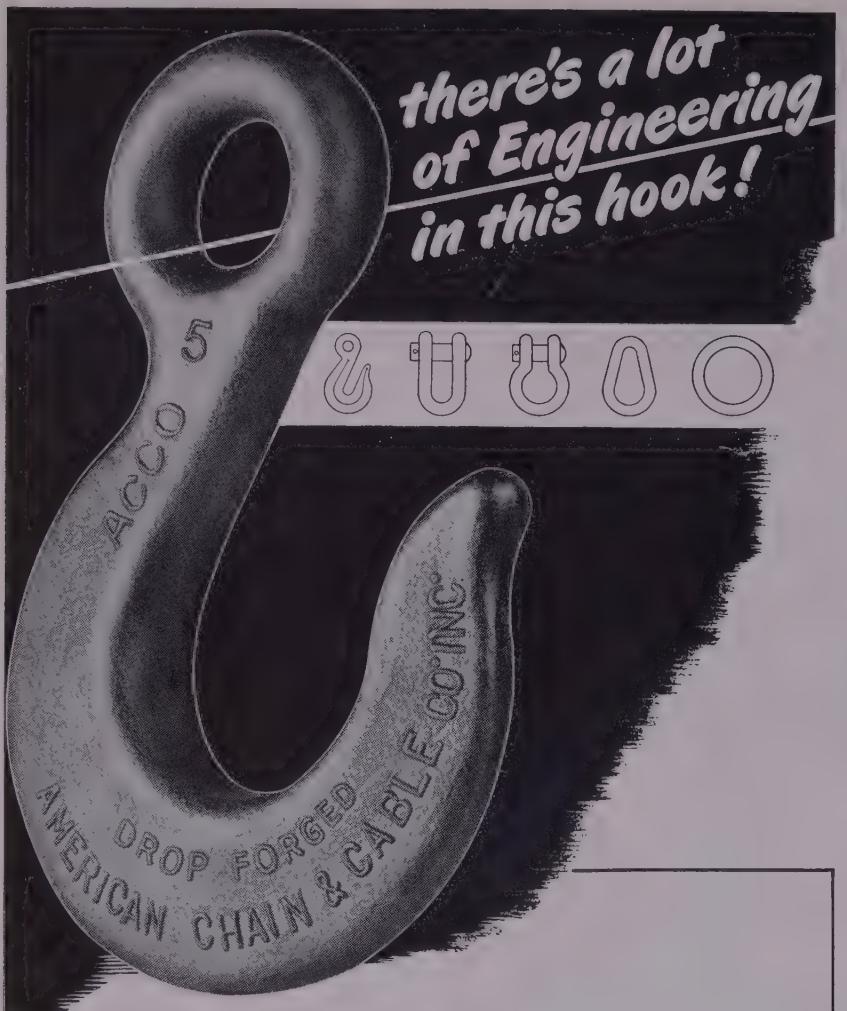
One midwestern producer who continues in operation has promised some cold-finished sheets for late December, provided buyers will add a certain percentage of hot steel. Such an early delivery on cold-rolled sheets is the exception.

Deliveries on hot-rolled sheets mills still producing average are six to seven weeks, although shipping schedules would be more extended if they were not restricted to sales to own customers. Consumers of sheets are turning more and more to warehouses. Users of sheet metal still have close to 30 days' supply, but stocks are becoming unbalanced. Some sizable purchases, involving as much as 200 tons, have been made from jobbers along the eastern seaboard, but many more of substantial size have been rejected, especially by distributors who are endeavoring to protect their regular customer.

Boston—Cold-rolled strip supplies in better volume than that of sheet metal. Most district nonintegrated mills stocks of hot-rolled material are sufficient for five to six weeks' operations. Most consumers are drawing on inventories to maintain operations and some will feel a pinch in carbon grades, notably in cold-rolled and galvanized, before November unless shipments are resumed. Producers still operating are under pressure for additional tonnage, but holding to original orders. Galvanized products are in shortest supply of all flat-rolled grades. Much scheduling with extensions in delivery dates will confront sheet mills when the strike ends. An upsurge in buying also is likely, as well as a possible broadening of the allocation policies.

Pittsburgh—Rapidly dwindling inventories of sheets and strip will be reflected in gradual curtailment of production schedules among metalworking companies. At start of strike most users had 4 to 6 weeks' inventory. However, unbalanced supply position in regard to vital components and efforts to maintain at least partial operations as long as possible likely will necessitate early tapering in manufacturing schedules. Electrical appliance concerns are rateing output to dealers so as to establish as equitable a distribution of their products as possible. The mills still operating have been subjected to terrific pressure for deliveries. Some cold-rolled strip mills are still operating.

Philadelphia—Most mills are closed down, district sheet sellers report fairly active inquiry. Consumers interested in obtaining production schedules so as to get early shipment once operations are resumed. Some generally are not accepting tonnage for shipment beyond the end of the year, except from regular trade.



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in certain instances are not even doing that. One district producer of hot sheets, whose operations have not been affected by the strike, has filled schedules for the fourth quarter and has withdrawn from the market. A Baltimore producer of stainless sheets is confronted with a shortage of slabs because of strike at the plant of its principal supplier.

Cincinnati—Armco Steel Corp. is under pressure for deliveries from plants still operating. First obligations to those with bookings at the corporation's strike-bound mills likely will eliminate any freed sheet tonnage. Little tonnage, except for specialties, has been accepted for first quarter.

St. Louis—Local sheetmakers, untouched by the steel strike, are being offered many new orders from eastern areas. A selected few are being accepted, but old customers are permitted to book their needs as far ahead as they desire. Rejects and second quality sheets are in big demand. Premium priced offers are not numerous, but occasional conversion offers are being made to back up pleas for acceptance of sheet orders. Pending settlement of the strike, Granite City Steel Co. has tentatively postponed until the second quarter its plan to shut down its tin plate line in January for improvements.

Los Angeles—Pressure for sheet

deliveries is increasing, with consumers becoming more concerned over effect of an extended shutdown. Several thousand tons of prestige shipments are enroute to jobbers, fabricators, but warehousemen estimate sheet stocks will be exhausted in a few weeks. No major customer, however, has found it necessary to suspend for lack of material. Some gray market operations are reported. Warehouses generally are allocating sheets, while Kaiser Steel Corp. has placed most flat-rolled items on a semiallocation basis.

San Francisco—Steel strike has hit users of galvanized sheets particularly hard. Supplies were adequate when the walkout began and may be used up by mid-October, at least by the end of the month. In the third week of October, the shortage of all grades of sheets will begin to pinch and most of the supply will evaporate early in November.

Structural Shapes . . .

Structural Shape Prices, Page 119

Pittsburgh—Expansion programs among major industries, such as electric utilities, will be set back as a result of the steel strike. A number of structural fabricators' plants are idle, while those still operating have less than two weeks' supply of steel on hand. Fabricators were unable to augment steel inventories prior to the strike because of the inability to determine beforehand exact size specifications required for future work.

New York—District fabrication shops continue in operation, stocks are becoming unbalanced in certain instances. Should the strike continue for a few weeks, many will be forced to suspend due to lack of steel. Some shops with contracts are confronted with possible strikes. Structural inquiry is less active, due to uncertainties created by the steel strike and to seasonal influences.

Boston—Bulk of structural tonnage being estimated is for public works, notably bridges. More than 500 tons will be required for 42 bridge overpasses and grade eliminations along a highway between Newton and Wakefield, Mass. District shops are buying little fill-in tonnage from warehouses, but a New York steel shop is seeking 200 tons to complete a bridge.

Philadelphia—While new inquiry is tapering, a fair sprinkling of structural orders has been placed, including some private as well as public work. Only one district fabrication shop is down so far; others indicate they will be forced to curtail because of unbalanced inventories in the near future unless the labor controversy in steel is settled.

San Francisco—Because of the high level of demand in recent months, inventories of most structural items were in good shape at the start of the steel strike. Wide flanged beams were an exception, supplies of which are expected to last until Nov. 1.

Seattle—Fabricating plants report slow business, although a fair tonnage of structurals is involved in small jobs for schools and industrial construction.

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- Cinder Notch Stopper
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- Blast Furnace Cold Blast Valve

- Blast Furnace Blow-Off Valve
- Check and Snort Valve
- Mixing and Check Relief Valve
- Blast Furnace Stove Checker
- Fabricated Steel Stove Bottom
- Regenerative Furnace Checker
- Precision Table Feeder
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ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

Plates . . .

Plate Prices, Page 119

New York—With only two eastern plate mills in operation, supply has been reduced to a level well below demand. Buying of plates for a considerable time had been sluggish, with most producers up to the time of the strike able to make deliveries within three to four weeks or less. The two eastern producers in operation have little to promise under five weeks and could extend their positions further if they were not disposed to confine commitments to regular customers.

Central Iron & Steel Co., Harrisburg, Pa., division of the Barium

Steel Corp., has agreed to the terms of the union in setting up pension and insurance benefits on a completely management-financed basis. In meeting advanced costs, the company has increased prices on plain carbon plates \$5 a ton. Its new price is now 3.75c, mill. No change was made in the company's price on floor plate.

Philadelphia—Plate demand is in excess of the supply available from the two eastern mills in operation. Backlogs at these plants are increasing with delivery promises extended to around five weeks.

Some cancellations have been made by consumers who find they cannot go ahead with schedules because of shortages in other lines.

Sun Shipbuilding & Dry Dock, Chester, Pa., noted in the Oct issue as being low on two combination passenger and truck-trailer vessels for west coast operation, is on a bid to build 10 additional sets of such type. Each ship will require 8500 tons of steel, principally plate.

Ingalls Shipbuilding Corp., Pascagoula, Miss., has been awarded construction of a single screw ship with turbine propulsion to serve as an experiment in the possible placing of the Liberty type cargo vessel of World War II in the event of an emergency. Contract calls for payment of \$4,744,000 to cover construction and an additional \$790,000 for engineering work and design. Maritime commission opened Aug. 15.

Boston—Delay in delivery of plates required for specific projects looms. A substantial tonnage needed for 48-in. water line carries specifications for deliveries starting in November, which appears doubtful of fulfillment. Tank shops will need tonnage next month, although inventories are about matched order backlog Oct. 1. Shops have difficulty in acquiring material for fabrication to cover orders taken since that time. Stocks of floor plate held by warehouses are ample for near future needs.

San Francisco—Continued operation of Kaiser's Fontana mill provides fairly substantial inventories of plates. Inventories tend to temper worry in immediate future on part of consumers. Should the strike last more than two months, shortages probably would occur.

Seattle—Demand for plates is slow, although several sizable jobs are pending. The smaller shops are operating only part time and repair prospects not promising for the immediate future.

Offers Free Machining Steel

Chicago—Joseph T. Ryerson & Sons, Inc. are again marketing a lead-free machining steel sold under manufacturer's copyrighted trade name of Ledloy. Leaded steels were first manufactured by Inland Steel Co. prior to World War II. During the war and in the postwar period production of leaded steels was curtailed and was resumed only recently.

Reinforcing Bars . . .

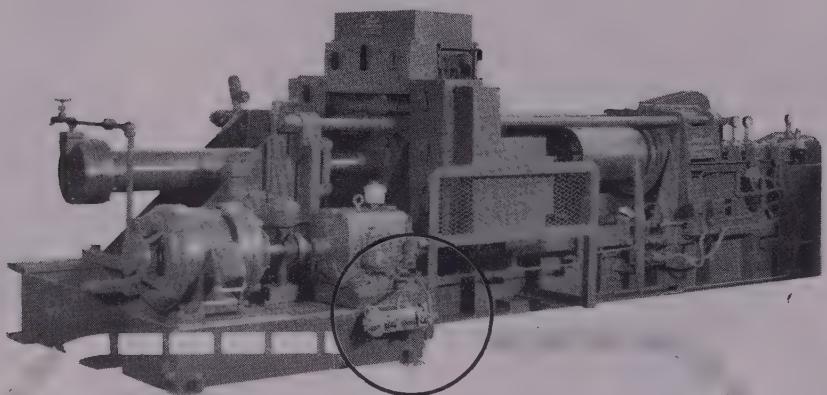
Reinforcing Bar Prices, Page 119

San Francisco—Supplies of reinforcing bars are sufficient to carry most users for about two months. The steel strike is prolonged, press will mount.

Tin Plate . . .

Tin Plate Prices, Page 120

San Francisco—Completion of most of California's heavy summer fruit and vegetable packing schedules at the time the steel strike started indicates no distress is likely. Agreement between American Can Co. and the union also will help relieve a prospect of shortages arising in plants which put up foods on a year-around basis.



RECORD-SPEED TUBE FORMING MACHINE HAS BUILT-IN HYDRO FLUID TEMPERATURE PROTECTION

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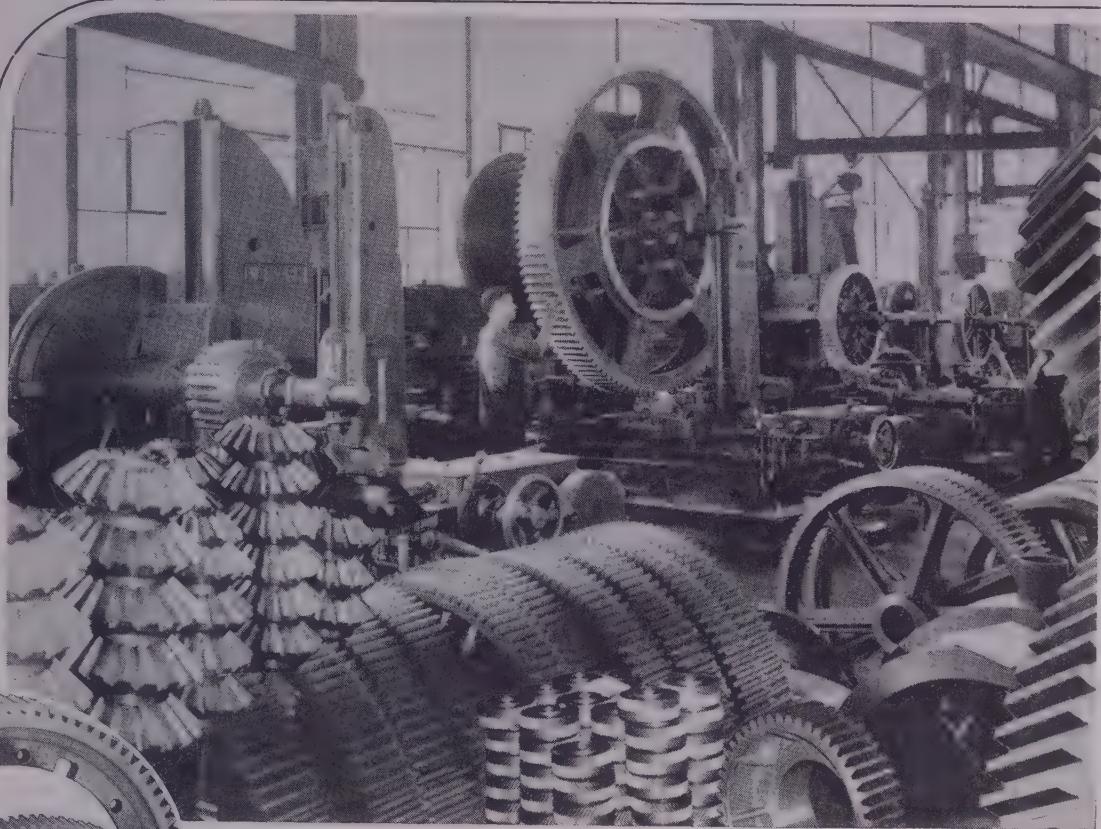
As in this Federal Machine, "BCF" Exchangers are the surest, simplest means of moderating excessive heat in any hydraulic equipment. Full standardization and immediate delivery of "BCF's" from stock make it easy for any hydraulic equipment manufacturer to provide its products with unexcelled heat transfer efficiency . . . make it easy, too, for users to equip present machines. Ross Heater & Mfg. Co., Inc., Div. of American Radiator & Standard Sanitary Corp., 1431 West Ave., Buffalo 13, N. Y. In Canada, Horton Steel Works, Ltd., Fort Erie, Ont.

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Steel Bars . . .

Bar Prices, Page 119

Pittsburgh—All cold-finished producers in this district are idled either because of strike at plants lack of hot-rolled steel. Colum Steel & Shafting Co. was the last to shut down its mill. This inter had extended its contract on an indefinite basis Oct. 11, but steel shortage forced closing of this plant last week. It is difficult to ascertain the adequacy of cold-finished inventories in customers' hands, though most trade observers believe these stocks are not sufficient to sustain metalworking operations more than 3 to 4 weeks.

New York—Although most mills are down because of strike they are still willing to book orders for shipment as early as possible after production has been resumed. Orders are entered for production the order they are received. Much time can be lost by waiting until strike is ended before placing orders but consumers are inclined to move slowly, partly because of the uncertainty as to their own labor situation in some instances and also the predictable business outlook in general. About best delivery offered hot-rolled carbon bars is six to seven weeks after resumption of mill operations.

Boston—Production of cold-finished carbon bars, restricted for several months, is still lower. Consumer stocks generally are balanced and sufficient to cover needs for six weeks. Shops supplying parts for automobile assemblies, however, are drawing steadily from inventory, cladding some alloy.

Los Angeles—Despite loss of several days' production due to mechanical difficulties in its new bar mill at Niles, Calif., Pacific States Steel Corp. is back to capacity operations. The company has resumed shipment of bars, structural, and merchant steel and is booking for late November and December delivery.

San Francisco—No widespread serious distress in merchant bars is expected until December. Supplies are adequate to carry most consumers until that date.

Seattle—Northwest Steel Roll Mills Inc., this city, is operating at capacity, but the strike has completely closed Bethlehem's local plant.

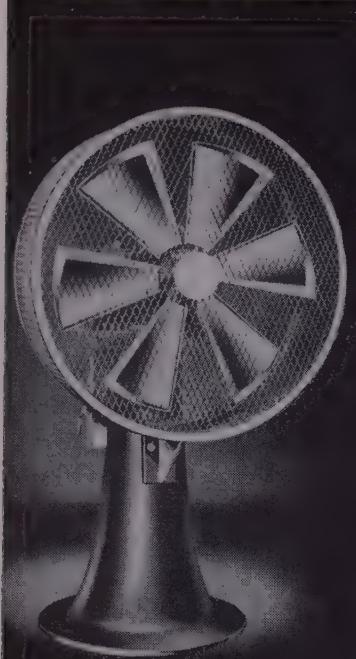
Tubular Goods . . .

Tubular Goods Prices, Page 122

Los Angeles—Demand for pipe has up considerably since start of steel strike, with pressure on supplies stronger than in many months. Kaiser Steel Corp.'s pipe mill at Fontana is booked well into first quarter, 1950.

San Francisco—Supplies of cast iron and small steel pipe are sufficient for at least 30 days' needs. Beyond that some users will begin to pinch. Pipe procurement will be eased by continued operation of Kaiser's facilities.

Seattle—Cast iron pipe agents are marking time, as little new business is developing. Some orders being filled out of stock, inventories now being fairly complete.



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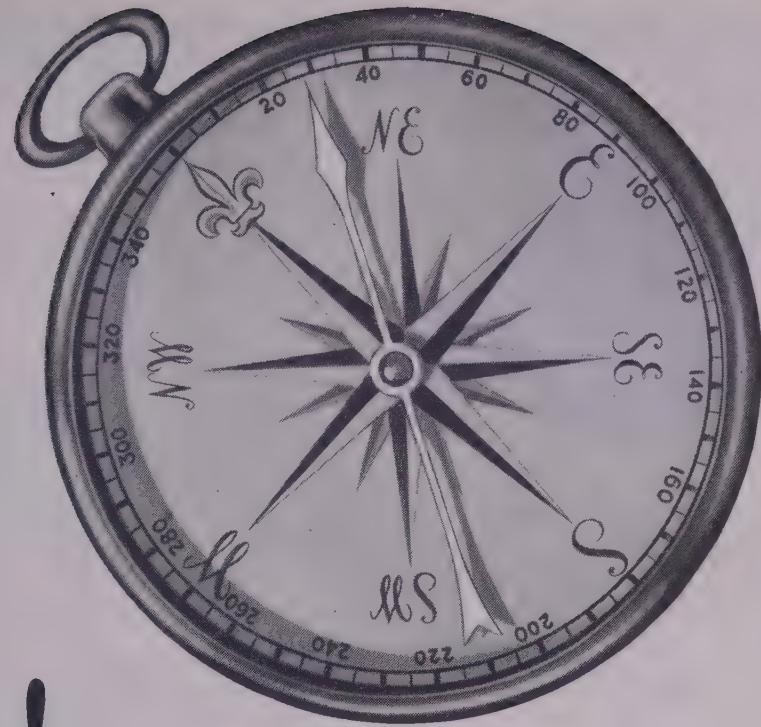
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Let's look at the record:

Here's what's happened all over America just during the last 40 years.

Income: Since 1910 we have increased our annual income per household from an average of less than \$2400 to about \$4000 (in dollars of the same purchasing power), yet—

Work hours: Since 1910 we have cut work hours down an average of 18 per week—equivalent to more than two present work days.

How did we do this? Through—

Machine power: We have increased the supply of machine power *4½ times* since 1910. This increased machine power gave us—

Increased productivity: This made it possible for us to more than *double* the

output of each of us for every hour we work.

The best is yet to come

This is what we have done, and this is the way we have done it—to get higher wages, shorter hours, and lower-cost goods for everybody.

And this is the way we can make a still better living in the future—with *greater* use of machine power, *better* machines, *better* distribution, *better* collective bargaining.

Sure, our system still has faults . . . but none that we cannot cure if we all work together to do it.

Approved for the Public Policy Committee of The Advertising Council by:

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Executive Director, Twentieth Century Fund

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Formerly President, Studebaker Corporation

BORIS SHISHKIN

Economist, American Federation of Labor

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OF
AMERICA

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In words and pictures, it tells you

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- Why Americans enjoy the world's highest standard of living
- How mass production began
- How we have been able to raise wages and shorten working hours
- Why the mainspring of our system is productivity
- How a still better living can be had for all

MAIL THE COUPON

to Public Policy Committee, The Advertising Council, Inc., 25 West 45th St., New York 19, N. Y.

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Like many American firms, we believe that business has a responsibility to contribute to the public welfare. This advertisement is therefore published in the public interest by:

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THE BOLT MANUFACTURING COMPANY
327 Pine Street Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

Roebling Increases Prices

Trenton, N. J.—John A. Roebling's Sons Co. has increased prices $\frac{1}{2}$ -cent a pound, effective as of Oct. 4, on its strip and wire products. New prices, f.o.b. mill this city, are: Cold-rolled carbon steel strip, 5.00c for 3 in. and wider and 5.50c for over $\frac{1}{2}$ -in. to under 3 in.; cold-finished spring steel strip, annealed 6.30c for 0.40-0.60 carbon, 6.90c for 0.60-0.80 carbon, 8.85c for 0.80-1.05 carbon, 11.15c for 1.05-1.35 carbon; MB spring wire, high carbon, 6.35c; rope wire, 8.00c for mild plow, 8.30c for plow, and 8.70c for improved plow; cold-rolled flat wire, 5.80c; fine and weaving wire, 8.50c. The upward price revision is attributed to higher production costs arising from the granting of noncontributory pension and insurance benefits to employees.

Wire . . .

Wire Prices, Page 121

Fostoria, O.—Seneca Wire & Mfg. Co., this city, has raised mill prices $\frac{1}{2}$ -cent a pound on high-carbon MB spring wire to 6.05c, on cold-rolled flat wire to 5.50c and on rope wire to 8.00c for mild plow, 8.30c for plow, and 8.70c for improved plow.

Boston—Volume of finished wire production is substantial, despite inactivity of the largest district mill. One integrated and several nonintegrated mills are operating; their output is larger and more diversified than before the strike started. Inventory position of wire consumers varies; one plant in western Massachusetts has curtailed operations, due to lack of steel, and considerable upholstery spring wire on mill books has not been shipped. Screw manufacturers have steel for 30 to 45 days' needs. Razor blade steel inventories are substantial.

Washington—American Chain & Cable Co., Wilkes-Barre, Pa., has been awarded contract for 48 units of wire rope at \$100,800 by Aviation Supply Office, Navy Department, Philadelphia.

South Has Small Steel Stocks

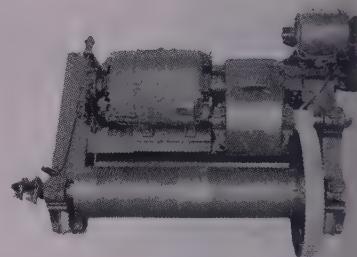
Birmingham—Indications increase that additional wholesale layoffs in steel-dependent industries of the district cannot be postponed much longer than another 10 days to two weeks. Inquiry reveals varying degrees of inventories, but overall supplies are not sufficient for more than two weeks operations at current rate of consumption. Connors Steel Co., only producer operating in this district, is being hard pressed, especially for cotton ties with the season at its height. Considerable demand is being exerted also for concrete reinforcing bars from the same company.

Kaiser Expansion Progresses

Oakland, Calif.—Kaiser Steel Corp. is scheduled to place its new blast furnace in operation at its Fontana plant late in October. Work is proceeding on the company's new continuous hot strip mill at the same works, completion due about Jan. 1, 1950.

STOP

OIL SHOWERS FROM CRANE MOTOR



WITH

NON-FLUID OIL

TRADE MARK REGISTERED

Why put up with this visual evidence of high lubrication and application costs? Besides, NO FLUID OIL saves further time and money because its triple qualities cut down stock cleaning costs.

See for yourself how NO FLUID OIL gives cleaner lubrication and spotless products. Economically. Write today for descriptive bulletin and free, testing sample of NON-FLUID OIL

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Detroit, Mich. - Chicago,

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NON-FLUID OIL is not the name of a general class of lubricants but is a specific product of our manufacture.

Carboly Cuts Standard Blanks

Detroit — Carboly Co. Inc., this, has reduced prices 10 per cent all standard blanks in package quantities, effective Oct. 3. A new quantity discount of 5 per cent on individual orders for five to nine identical packages of standard tools and blanks in package quantities for immediate delivery has been initiated. This quantity discount applies to both stocked and nonstocked grades. In addition, nonstocked grades standard tools and blanks in lots of 5 or more packages are available the same price as the stocked items. The company's packaging program has been broadened to form more closely to industry requirements. For example, certain standard blanks originally packaged in lots of 100 can be obtained in packages of 50 each.

Firth Sterling Revises Prices

McKeesport, Pa. — Firth Sterling Steel & Carbide Corp. announces price cuts averaging 10 per cent on tungsten carbide tips and blanks, effective Oct. 5. Firth Sterling also announces new package lot prices and additional discounts on package quantities of tips and carbide-tipped general purpose tools.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 122

Pittsburgh—Not all producers of fasteners have been affected by the steelworkers strike. Some tonnage cancellations have been received, damage that undoubtedly never will be recovered. Prior to Oct. 1, producers of nuts, bolts and rivets had experienced a moderate improvement in order volume, not all of which was attributed to protective buying by customers.

Refractories . . .

Refractories Prices, Page 122

Cincinnati—A new tunnel kiln is being built by the Allied Engineering Division, Ferro Enamel Corp., Cleveland, at the Taylor, Ky., plant of Taylor Sons Co., manufacturers of special refractories. Erection of the continuous kiln will increase production capacity and improve delivery. It is scheduled to be completed by Nov. 15, 1949.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 122

Chicago—Foundrymen are trying desperately to lay in coke. The shortened work-week and then the strike caught many in the process of packing off what, in the light of non-prevailing business conditions, were oversupplies. A two-pronged pressure closed suddenly upon them: less coke available; greater consumption as business picked up. Coke users are selling selectively. Discrepancy pleas can still be acted upon if a real need must be shown. One principal supplier must allocate.

46 years of crane building experience





This impressive span of successful enterprise, plus the helpful comments and suggestions from a long line of users, has taught us how to build cranes that emphasize accessibility, rigidity, long life, safety and economy. **BEDFORD CRANES** are built in any span or lift, 5 to 150 tons capacity, designed and engineered to meet your requirements.

We also do structural steel work and produce gray iron castings.

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Engineers • Designers • Fabricators

"The New Twist"

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• Gerrard Round Steel Strapping is adaptable to almost every type of tying operation. Between the 18 gauge strapping for protecting parcel post packages and the 8 gauge strap for securing carload lots of steel pipe or machinery, there's a size of Gerrard Strapping that will do your job perfectly.

Because it's *round*, Gerrard Steel Strapping grips where it touches. It is ideal for pallets and has been used successfully to palletize such odd shaped objects as auto springs and rear axles. And Gerrard Round Steel Strapping costs about 40% less than any type of metal reinforcement.

Gerrard engineers will gladly consult

with you about your strapping problems free of charge. Send for the *Blue Book of Packaging*. It is free. **GERRARD STEEL STRAPPING COMPANY**, 4745 So. Richmond Street, Chicago, Illinois.

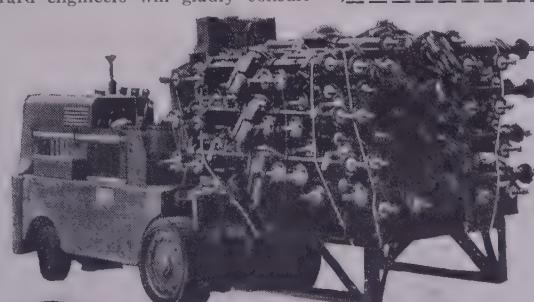
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Company

Address



Gerrard Round Strapping grips where it touches, conforms to the odd shape of the auto axles on the pallet.



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ROUND STEEL STRAPPING

UNITED STATES STEEL



Greater Tonnage
Per Edge of Blade

A

AMERICAN
SHEAR KNIFE CO.
HOMESTEAD - PENNSYLVANIA

Foreign Ore Prices Drop

New York—While principal foreign grades of iron ore and manganese ore are generally unchanged, devaluation is now beginning to affect tungsten and chrome ore prices which are off sharply. Wolframite and scheelite are down \$6 a net ton unit to \$20-\$22, duty paid. Chrome is off generally from \$1.50 to \$7 depending upon grade.

Pig Iron . . .

Pig Iron Prices, Page 118

Pittsburgh—Foundries serving the plumbing and radiation industries are particularly concerned over the prospective shutdown of pig iron supply sources. While most of these interests have substantial inventories, they desire still larger ones to support the higher operating schedules. Foundries serving railroad and coal mine car industries continue in the doldrums. Ingot mold manufacturers have been adversely affected by the steel strike. Jobbing foundries have ample pig iron inventories, but their order volume has receded sharply since Oct. 1. Pittsburgh Coke & Chemical Co.'s stack at Neville Island remains in operation.

New York—District foundries are fairly well supplied with pig iron and coke. However, they are still pressing for both, as they do not know how long the steel and coal strikes will continue. Three blast furnaces still are operating along the eastern seaboard. Pressure for iron has resulted in some modest buying of foundry grade from abroad—iron on which deliveries are expected within about three to four weeks.

Boston—Foundries are melting more iron, improvement centering largely among jobbing and smaller miscellaneous shops. Machine tool casting requirements are slow and melt by larger consumers in textile mill equipment industry continues restricted; one large shop in Rhode Island is adding an extra shift to its schedule. Bulk of orders is for prompt delivery; forward volume is slow. Most furnaces normally shipping to New England are down, but the Mystic furnace at Everett, Mass., continues operations and has a well balanced supply of foundry and malleable in reserve.

Buffalo—Shortage of coke is causing a sharp recession in foundry operations. Four of the leading melters in the area have slashed operations due to the coke scarcity.

Chicago—Three furnaces at Wisconsin Steel Co. and one at Interlake Iron Co. are producing iron in the district. Some iron is available also from outside the immediate area, if a consumer wants to pay the freight. As yet, there is no concerted drive to get more iron. It's useless if a foundry can't get enough coke or its customers can't put a finished casting into some otherwise incomplete end product. Foundry operations are not seriously affected by the steel-coal tieup.

Cincinnati—Foundry operations in this district vary widely, with the average about 50 per cent of capacity. Shipments of pig iron are being received and this tonnage, sup-

plemented by melters' stocks, will outlast supplies of coke in case strikes are prolonged.

Birmingham—Operations of North Birmingham plant of U. Pipe & Foundry Co., have been reduced from a double shift to a single shift basis. General business conditions are responsible, the company announces.

St. Louis—Koppers' production at Granite City, Ill., continues at a high rate. Officials are considering blowing in the second blast furnace to meet the increasing demand from strike-bound areas. Numerous orders from customers of northern and eastern furnaces are being received and some are being filled from ground stocks. The No. 2 stack will probably be lighted immediately without the coal and coke situation.

Scrap . . .

Scrap Prices, Page 125

Pittsburgh—Scrap continues to move to the three integrated producers operating in this district. At least one interest has placed significant tonnage orders for open-hearth scrap at quoted levels. Relatively little tonnage of local industrial scrap accumulated during the first two weeks of the steel strike. In some instances, metalworking operations have been curtailed to conserve scrap supplies. Other offsetting factors include substantial reduction in amount of scrap generated because of strike among many metalworking companies here; while some large integrated mills are still accepting shipments of industrial scrap for stock outside of plant premises. There is little activity in the market for turnings, although one small sale last week was at \$22 for short shovels. Recent railroad scrap list available has been within the range of \$32.50 for No. 1 heavy melting scrap and \$33-\$34 for railroad specialties. Little of this tonnage came to Pittsburgh mills. No weakness in scrap quotations is anticipated unless the steel strike continues for another two to four weeks. Still higher scrap prices may develop if the mills re-enter the market simultaneously following termination of the strike.

Boston—Demand for steel scrap lags with prices for most part holding advances made over recent weeks. Cast grades are also slow, but still more life than steel scrap. Pendulum has swung full arc in relation to pig iron and scrap. Last year scrap went higher than pig iron; situation is reversed with foundry iron at \$50.50, furnace, mixed cast around \$28, delivered.

Philadelphia—Steel scrap prices nominally unchanged, buyers and sellers marking time. No. 1 cupola is lower at \$32.50, delivered, and No. 1 machinery cast and clean auto are off nominally to \$36-\$37. No. 1 cast wheels are nominally lower at \$35-\$36, reflecting lower offers from brokers. One district consumer of steel scrap has 200 cars of scrap and other raw materials on track when he is unable to unload because of strike.

New York—Except for scattered orders for cast, the scrap market

iet. Brokers' buying prices for grades are nominally unchanged. Chicago—Brokers who still hold substantial scrap orders from struck are running into considerable difficulty in obtaining material. Some these orders are not dated and will be filled whenever the strike ends. It is moving, however, quantities of No. 2 steel and cast iron borings laid down adjacent to the plant major consumer. Limited tonnage also is going to operating mills. 2 heavy melting scrap involved in sale this month is said to be inferior in quality, its price not being representative of the market. One dealer is unable to buy No. 2 steel at \$50, dealers being disposed to hang on to material in expectation of a surge when strike ends.

ffalo—Strength continues to permeate the scrap market despite absence of new business. Dealers covering prestrike sales also are paying in line with present quotations for all material. Except for small tonnage of cast moving to foundries, movements are nil.

leveland—With most of the steel strike strikebound, bulk of the demand for scrap is coming from foundries.

The steel strike has not yet affected the price structure.

incinnati—Scrap prices are steady despite mill shutdowns. Tonnage is moving steadily to Hamilton and Middletown mills and to foundries.

. Louis—Mill buying of scrap for further stockpiles has begun. Current quotations have improved

industry shipments and considerable tonnage is coming in from embargoed areas. Brokers claim established

price on No. 2 heavy melting is \$25.26, but at least one consumer has bought as low as \$23. There apparently is urgency behind scrap buying.

Los Angeles—Most of the scrap movement in this district is on a broker-dealer basis, with little mill buying except by the one major steel producer remaining in production.

attle—Since the largest buyer is out of the market because of the strike, little interest is being shown in scrap.

Warehouse . . .

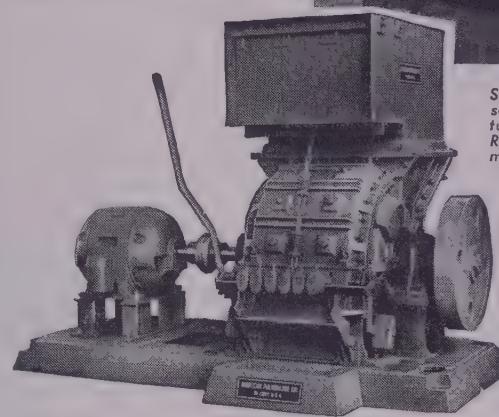
Warehouse Prices, Page 122

ttsburgh—Unprecedented demand for steel from warehouse stocks developed since Oct. 1. Survey leading distributors not on strike in this district indicates average increase of nearly 100 per cent in shipments from stock to date this month compared with the like period in September. Edgar T. Ward's Pittsburgh warehouse closed Thursday, as did parent company, Columbia Steel Manufacturing Co. Columbia was forced to shut down despite an indefinite extension of its contract Oct. 11 because of lack of hot-rolled steel for finishing.

hiladelphia—Warehouse stocks are being doubly squeezed. Because the mill tie-up, consumer demand is heavier and jobber stock replacements are almost impossible.

oston—Demand for steel from warehouses is stronger, reflecting increase of tonnage from most mills. Buying of sheets is heaviest with dents appearing in inventories of galvanized

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Segregated turnings being fed to special square hopper of an American #2400 metal turnings crusher, powered by 50 HP 900 RPM motor. Crown Cork & Steel Co., Baltimore.

THE AMERICAN METAL TURNINGS CRUSHER

Long, curly turnings of steel, alloys, brass, aluminum, etc. are rapidly reduced to easily-handled chips, requiring only a fraction of usual storage space and increasing cutting oil reclamation to 30 to 50 gallons per ton.

Americans soon pay for themselves!

American PULVERIZER COMPANY
Originators and Manufacturers of
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PRODUCTION UP . . . COSTS DOWN with . . .

HOLE-HOG
MACHINE TOOLS

- Multi-Spindle Boring
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- Vertical and Way-Type Fixed Center Drilling, Boring and Tapping
- Special Multiple Operation Machine Tools

"Hole-Hog" does it better with 50 years of Machine Tool Engineering experience at your service.

MOLINE
TOOL CO.,
MOLINE, ILLINOIS

ized and cold-rolled items. Lagging behind the trend are cold-finished bars with which most distributors are well stocked. Selling off inventory last quarter, one industrial user disposed of about 500 tons of cold-finished sheets to a warehouse. What is left of the tonnage has been repurchased by the first seller at a premium, or at the warehouse price.

Chicago—Call for warehouse steel is more orderly at present than it was at peak of the shortage. Reasons are: Remarkably few metalworking companies as yet are suffering ill effects from the strike; there is no widespread shortage encompassing all products; what is in short supply with one company may be ample with another; enough mills are operating to soften the pinch. Mal-adjusted inventories, however, will be the cause of most difficulty if the strike is prolonged.

Cincinnati—Demand on jobbers has increased sharply as a result of strikes. On the most popular items, a form of rationing has developed as a means of conserving stocks and of meeting regular customers' needs.

Los Angeles—With extreme pressure for deliveries exerted by sheet consumers, warehousemen have placed this product on strict allocation. Although most jobbers have additional tonnages enroute, their sheet stocks are expected to be depleted by end of the month.

San Francisco—Overall inventories held by jobbers at the start of the steel strike were excellent. This was due to the end of the 109-day strike

of the warehousemen's union coincidental with start of the steel strike.

Rails, Cars . . .

Track Material Prices, Page 122

Pittsburgh—Railroad interests are placing rail orders for 1950 delivery. The tonnage involved is substantially less than the amount received in 1949. Railroads have been hardest hit among non-striking industrial groups as a result of the steel and coal strikes. This situation is expected to further accentuate the already depressed orders for freight cars, auxiliary equipment, and rails.

Philadelphia—Pennsylvania Railroad will close bids Oct. 21 on its 1950 rail requirements—60,000 tons, plus or minus 40 per cent. This railroad a year ago inquired originally for 175,000 tons, but later cut back. It is estimated that the Pennsylvania will not lay more than 60,000 tons in 1949. There has been no inquiry for the usual track accessories, although bids were closed Oct. 14 on switch rail crossings, bridge rails and shoes.

Chicago—Due principally to labor strife, most railroads are planning to order only the barest minimum of new rolling stock next year. Car ordering has been virtually dormant for several months and builders have cut their production to stretch out order backlogs as far as possible.

New York—Freight car buying continues light with orders in September totaling 123 units, according to the American Railway Car Institute. Deliveries in the month totaled 6141

units. Backlog as of Oct. 1 was 203 cars compared with 108,892 year ago.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5000 tons, state bridge, Yorktown, Va., Virginia Bridge Co., Roanoke, Va.

1500 tons, gates, stop logs, hoists, etc., McNary dam, to Consolidated Western S Corp., Los Angeles, low \$641,280, by U. Engineer.

900 tons, Lord Baltimore Press, Baltimore, Bethlehem Steel Co., Bethlehem, Pa.

200 tons, fabricating plant addition, Pacific Car & Foundry Co., Seattle.

200 tons, state bridge, Bradford, Pa., Pennsylvania, to Pine Brook Iron Works, Scranton, Pa.

200 tons, municipal health center, Philadelphia, to Grays Metal Works Inc., that city.

170 tons, Lynnewood elementary school, Upper Darby, Pa., to Acorn Iron Works, Philadelphia.

160 tons, building, Lebanon Valley College, Annville, Pa., to an unnamed fabricator.

140 tons, building, Baltimore Markets, Vandland, N. J., to Max Corchin Inc., Philadelphia.

140 tons, cabinet painting plant, Kaiserglazing Corp., Bristol, Pa., to Behn Iron Works, Eddystone, Pa.

100 tons, addition, chemical plant, Rohm Haas, Bristol, Pa., to Max Corchin Inc., Philadelphia.

STRUCTURAL STEEL PENDING

675 tons, Public School No. 175, Queens, N. Y.; bids asked.

650 tons, Public School No. 12, Brooklyn, N. Y.; bids asked.

650 tons, Public School No. 32, Brooklyn, N. Y.; bids asked.

630 tons, Memorial Arena, Johnstown, Pa., Berkebile Bros., that city, low on general contract.

190 tons, manufacturing building, V. Balata & Textile Belting Co., Easton, Pa.; bids asked.

190 tons, reactor building, Arco, Idaho; to Leonard E. Johnson, Idaho manager, Boise, Oct. 18.

Unstated tonnage, veterans hospital, Philadelphia; plans ready by Oct. 20 for bid Dec. 6.

Unstated, major phase \$21 million Lucky F project, Idaho; bids to U. S. Engineers, Boise, Oct. 20.

Unstated, materials for 400 unit, cell block addition, Oregon penitentiary, Salem; Datur Iron & Steel Co., Decatur, Ill., \$297,747.

REINFORCING BARS . . .

REINFORCING BARS PLACED

566 tons, dormitory, Cook county hospital, Chicago, to Joseph T. Ryerson & Son Inc., city.

465 tons, CHA apartment, site No. 3, Chicago, to Joseph T. Ryerson & Son Inc., that city.

465 tons, CHA apartment, site No. 6, Chicago, to United States Steel Supply Co., that city.

274 tons, freight house, Burlington railroads, Chicago, to Joseph T. Ryerson & Son Inc., that city.

200 tons, St. Patrick's hospital, Mississauga, to Northwest Steel Rolling Co. Inc., Seattle; J. C. Boesel, Seattle, general contract.

141 tons, Weber high school, Chicago, to concrete Steel Co., that city.

135 tons, two Washington state bridges, Bethlehem Pacific Coast Steel Corp., Seattle, State Construction Co., general contract.

120 tons, building, Felt & Tarrant Mfg. Co., Chicago, to Concrete Steel Co., that city.

REINFORCING BARS PENDING

2250 tons, Garrison district, Corps of Engineers, Bismarck, N. Dak.; bids Oct. 20.

1725 tons, chief, Equipment and Procurement Branch, Bureau of Public Roads, Washington, D. C.

A BETTER LONG STROKE BRINELL

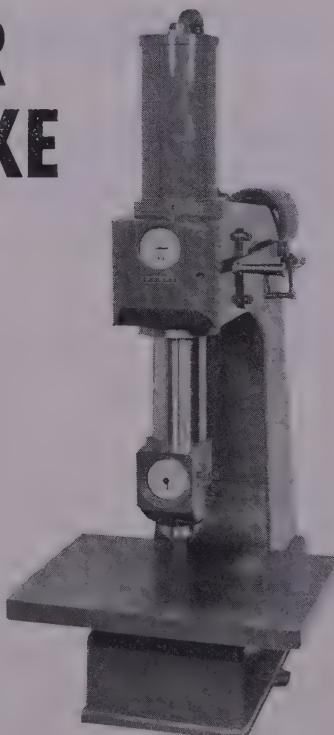
For you folk who test large or awkward parts, singly or on a production basis. The long stroke makes screw adjustment to work size unnecessary.

Large table eliminates extra help in handling. Table remains at a constant level and machine may be readily inserted in your conveyor line.

Straight Roller or Vee Roller table may be substituted for flat table shown.

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Available either direct reading, as shown, or as a plain Brinell in a size to accommodate your work. Motor to suit your current characteristics. Other types of standard machines also, in stock. Special machines built to requirements.



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Perforated STAINLESS STEEL

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STRONG • EASILY CLEANED
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PERFORATING STAINLESS STEEL, regardless of alloy content, has long been a specialty at H & K; in fact, meeting stringent specifications for heat, corrosion, acid and alkali resistance through the years has actually made this operation a science! Stainless Steel is one of the most difficult perforating assignments — yet, H & K will satisfy your requirements with skilled accuracy and master craftsmanship.

H & K Perforated Metals are produced to your specifications in practically any sheet, coil or plate material. Whether it's Stainless or any other metal—or a non-metal such as plastics, rubber, plywood, etc. — you can be sure the job is right. Send at once for full information on your problem — recommendations and prices.

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DIFFERENTIAL STEEL CAR CO., FINDLAY, OHIO

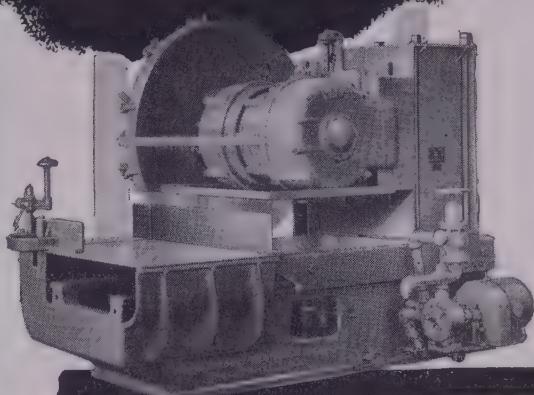
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AXLESS Trains and
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Standard for Service
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Ground to extremely
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Modern Sawing



**KLING HIGH SPEED
FRICTION SAWS**

24" 100-lb. I Beam 28 Seconds	15" 55 lb. Channel 15 Seconds	H 8" x 8" x 34.3-lb. H Beam 10 Seconds	9 Seconds 100-lb. A.R.A. Rail	
T 5 Seconds 6 1/2" x 6 1/2" x 19.8 lb. Tee	11 Seconds 8" x 8" x 3/4" Angle	10 Seconds 3" Square	15 Seconds 4" Round	11 Seconds 6" O.D. Tube 1/2" Wall

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Because of its versatile ability to cut many varied structural shapes, as well as solid or hollow bars in any sequence, without change of blade or set-up, one machine can handle a volume of cutting that would otherwise require several separate shears or slow speed saws.

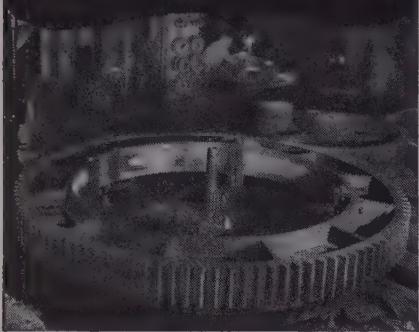
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LIBERTY at 25TH PITTSBURGH 22, PA.

ton; bids Oct. 25, deformed structural or intermediate grade.

230 tons, U. S. Brewing Co., Chicago; bids asked.

175 tons, Washington state road projects; bids in Oct. 9; 65 tons additional involved in bids called for Oct. 21.

115 tons, dormitory, Purdue University, Lafayette, Ind.; bids asked.

Unstated, \$1½ million Park Plaza apartment building, Portland, Oreg.; general contract to Reimers & Jolivette, Portland.

Unstated, \$650,000 Dominion Bank building, Vancouver, B. C.; general contract to Northern Construction Co., and J. W. Stewart Ltd., Vancouver.

PLATES . . .

PLATES PENDING

Unstated, 1200-foot, 23-foot diameter, Lucky Peak tunnel; bids to U. S. Engineer, Boise, Oct. 20.

Unstated, elevated steel tank and tower, for McNary dam; Chicago Bridge & Iron Co., Chicago, apparently low \$20,895.

Unstated, 60,000-gal., elevated water tank for Bainbridge Island, Wash.; H. D. Fowler & Co., Seattle, low \$21,480.

Unstated, bulk fuel storage tank, pontoon bridge, etc.; bids to Bureau of Reclamation, Grand Coulee dam, Wash., Nov. 8.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Baltimore & Ohio, ten 1000-horsepower diesel-electric switch engines, to Lima-Hamilton Corp., Lima, O.; addition of these switchers will give the Baltimore & Ohio a total of 213 diesel units of this type, in addition to 58 road passenger and 112 road freight diesel-electric locomotives.

Cincinnati Union Terminal, two 750-ton diesel-electric switch engines, to Lima-Hamilton Corp., Lima, O.

CONSTRUCTION AND ENTERPRISE

ALABAMA

MONTGOMERY, ALA.—U. S. Engineer, District Engineer, plans a synthetic liquid gas plant; Ford, Bacon & Davis, New York, architect.

CALIFORNIA

LOS ANGELES—Harbor Commission of Los Angeles has awarded contracts for a \$577,000 modernization of the Municipal Fish Markets. Undertaken under the harbor's \$10 million improvement program, the new fish market will be housed in a 67,000-sq ft building, with a separate structure for refrigeration equipment.

ILLINOIS

CHICAGO—American Can Co., operating five manufacturing units in the Chicago area, is erecting a structure at 6105 S. Oakley Ave.

CHICAGO—Sterling Bolt Co., 209 W. Jackson Blvd., operating a plant at 1228 W. Monroe St., acquired the former Mills Industries plant at Lake street and Kilpatrick avenue.

JOLIET, ILL.—International Harvester Co. has leased about five acres of floor space in the large plant at Rockwell Junction, near Joliet, Ill., which was used for naval storage during the war.

MICHIGAN

DETROIT—Federal Tool, Die, Machine & Engineering Co., 850 Oakman Blvd., has been formed by David M. Levine, same address, for manufacture of tools, dies and machines.

DETROIT—Northeastern Mfg. Corp., 1578 Wellington, has been formed by Carl Bostrom, 204 Avalon Ave., Highland Park, to

manufacture tools, dies and machinery. DETROIT—Permanent Mold Die Co. is 15533 Woodrow Wilson, has been formed Joseph B. Silver, Wilshire Hotel, to manufacture and sell molds.

DETROIT—Walker Stamping Corp., Beaufait, has been formed by Anthony W. czak, 17172 Waltham, to manufacture sell machinery, tools and metal products.

DETROIT—Robins Products Co., 14335 Eight-Mile Rd., has been formed as a general metal stamping business by Robert Brown, same address.

DETROIT—Star Cutter Co., 10040 Free Ave., has been formed by Vivian M. Staley, 15821 Pinehurst, to manufacture sell cutting and machine tools.

FENTON, MICH.—Universal Machine Co. is 316 Lincoln Ave., has been formed Donald V. Alpaugh, 513 Wakeman, for die work and manufacturing products.

ROYAL OAK, MICH.—San Jan Products Inc., 247 Washington Square Bldg., has been formed, to manufacture aluminum awnings by Sam Hyatt, 2420 Tufts Ave.

YPSILANTI, MICH.—Ypsilanti Fabricat Co., 2643 East Michigan Ave., has been formed by Don McCrady, 2637 East Michigan Ave., for fabrication of steel products.

MISSOURI

ST. LOUIS—Highway Department officials St. Clair county, Ill., expect to have completed engineering studies for proposed Clair county-Mississippi river bridge, which will connect Cahokia with South St. Louis Mo., at Chippewa street. Rough estimate place cost of bridge at \$8 million.

NEW YORK

BUFFALO—M. J. Grass Screw Machine Products Co. has been established at 19 Northampton St. by William N. and James Grass.

NEW YORK—Lever Bros. Co., food processor and manufacturer of soap and cosmetics, will move its headquarters Dec. 1 from Cambridge, Mass., to New York. To house its offices the company will build a 20-story office building on Park avenue between 53rd and 54th streets; construction will start in spring and building is expected to be ready for occupancy by the fall of 1951. Lever Bros. will maintain temporary executive offices at 505 Park Ave. and temporary general offices at 80 Varick St.

OHIO

CINCINNATI—Steelcraft Mfg. Co. plans to begin work on an addition to house operations formerly in Joliet, Ill., by Knob Bros. Mfg. Co., recently acquired. Products at Joliet included metal baseboards, window trim and stools.

CLEVELAND—Ultrakrome Inc. has been formed by Paul Fleischer of Ultramet Mfg. Co., 2800 E. 55th St., manufacturer of popular steel furniture, for the purpose of expanding into the chrome plating field. Ultrakrome Inc. will be located at the plant of Ultramet Mfg. Co.

CLEVELAND—Diamond Alkali Co., Union Commerce Bldg., has entered into a co-operative agreement for further development of the phenol operation of Reichhold Chemicals Inc. in Tuscaloosa, Ala. It is contemplated that under the co-operative plan, physical assets and operation of the plant will be transferred to a new Alabama corporation. P. J. Ryan, Reichhold president and general manager of the plant, will continue to direct its operation. Diamond Alkali has acquired an option to purchase one-half interest in the new Alabama company.

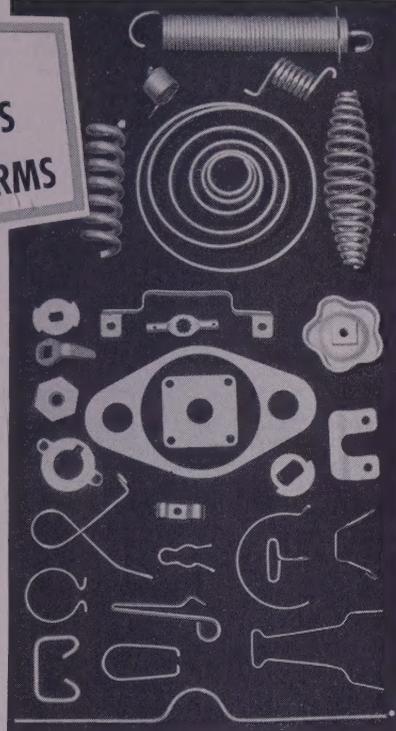
CLEVELAND—Interlake Iron Corp. has assumed control of operations and facilities of Interlake Chemical Corp. Headquarters remain at 1900 Union Commerce Bldg. business will be continued by the Coal Chemicals Division of Interlake Iron Corp.

CLEVELAND—Rex Metal Craft Co., manufacturer of ornamental iron products, 111 E. 82nd St., is building a \$15,000 plant 7216 Bessemer Ave., where it will

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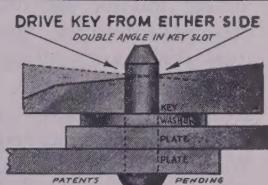
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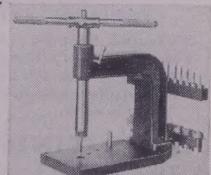
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upon completion of the project. Alfred Klein is president of the company.

CLEVELAND—Straehle Machine Products Co., 1426 W. Third St., will spend over \$75,000 for new machinery and a new plant at 12900 Berea Rd.

KENT, O.—Change of Ferry Machine Co., W. Main street, from a partnership to a corporation, and addition of W. B. Fageol Jr. as one of the firm's heads have been announced by Ernest S. Ferry, president. Mr. Fageol, of Twin Coach Co., is treasurer of the reorganized machine firm.

YOUNGSTOWN—Truscon Steel Co., 1315 Albert St., will erect a \$100,000 addition to its present building.

OKLAHOMA

BLACKWELL, OKLA.—City, George Fagin, atty., First National Bank Bldg., Oklahoma City, Okla., has plans in progress for power system improvements, cost \$1,250,000; Black & Veatch, 4706 Broadway, Kansas City, Mo., consulting engineer.

OREGON

SALEM, OREG.—State Board of Control will open bids Oct. 21 for boiler plant at The Dalles hospital and boiler plant addition at the Salem hospital. Five boilers and accessories are involved, plans by W. Bruce Morrison and T. E. Taylor, Portland, Oreg.

SALEM, OREG.—Decatur Iron & Steel Co., Decatur, Ill., is low \$297,747 for fabricating material for cell block addition to state prison.

VIRGINIA

RICHMOND, VA.—Chesapeake & Potomac Telephone Co. of Virginia plans expenditures of \$2,298,800 for improvement and expansion of telephone facilities throughout the area.

WASHINGTON

SEATTLE—U. S. Engineer contracts approximating \$5 1/2 million for construction of the Chief Joseph dam will be placed in November. These include the Columbia river bridge, bids Nov. 8, for which \$1 1/4 million is available. Other projects include excavating, utilities, buildings, powerhouse equipment and a steel and concrete bridge. Plans will be ready about Nov. 1 for turbines, Jan. 1 for generators and Mar. 1, 1950, for bridge type cranes.

ALASKA

KETCHIKAN, ALASKA—Harold Calvin, chief engineer, Ketchikan Pulp & Paper Co., announces construction of proposed \$30 million plant will begin in the spring of 1950, following completion of access roads.

CANADA

VANCOUVER, B. C.—Construction contract for \$650,000 Dominion Bank Bldg. has been awarded to Northern Construction Co. and J. W. Stewart Ltd.

FERROALLOYS

(Concluded from Page 123)

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, \$1.40 per lb of contained Ti; less ton \$1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot \$1.28, less ton \$1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract \$160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%). Contract, \$175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Bearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, \$2.90 per lb of contained

Va. Delivered. Spot, add 10c. Crucible-Sp Grades (Va 35-55%, Si 3.5% max., C 1% max.), \$3. Primos and High Speed Gr (Va 35-55%, Si 1.50% max., C 0.20% max.), \$3.10.

Grainal: Vanadium Grainal No. 1, 93c; N 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload \$1.20 per lb of contained V_2O_5 , freight allowed. Spot, add 2c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 W or more, \$2.25 per lb of contained 2000 lb W to 10,000 lb W, \$2.35; less 2000 lb W, \$2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract, 1000 lb or more, \$2.90 per lb of contained W; less than 1000 lb W, \$3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of a ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, \$1.20 per lb of alloy. Less than 100 lb \$1.30. Delivered. Add 5c, f.o.b. Washington, Pa., prices lb and over are as follows: Grade A (14% B) 75c per pound; Grade B (14-18%) \$1.20; Grade C (19% min. B) \$1.50.

Borosil: (3 to 4% B, 40 to 45% Si), \$4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton 2" x D, \$2.90 per lb of contained Cb, less \$2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4% Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 1.25%, C 3.50-5%). Carload, 12 M x D, load packed 19.0c per lb of material, ton 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 2% max., Ti 9-11%, B 0.55-0.75%). Carried, 1" x D, 43c per lb of alloy, lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-6%, Fe 20% approx.). Contract, carload, packed 1/2" x 12 M, 16.5c per lb of alloy, ton 17.50c, less ton 18.5c. Delivered. Spot, add 25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Mn 11%). C.l. packed, 17.00c per lb of alloy lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 1-2%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy, ton lots 15.75c; less ton lots 17.00c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Lump, bulk, carload 11.00c. Ton lots, 11.50c, packed 11.75c. Less ton lots, 12.55c per lb of alloy, f.o.b. Philo, O., freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% content with unitage of \$3 for each 1% above or below the base); Gross tons per load, f.o.b. seller's works, Mt. Pleasant, Tenn., \$65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, tained Mo, f.o.b. Langloch and Washington, Pa., furnace, any quantity \$1.10.

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Behind the Scenes...

Strike Notes

Last week we mentioned that trip over strike-bound Pittsburgh and the beautiful view made possible by the lack of smoke. This fine fall weather is keeping the air "bright blue" in many a mill town. But there are other byproducts of the steel strike, too. The bus station ticket seller in Lorain, Ohio, for example, reports a very sharp increase in southbound bus traffic, mostly due to Mexican and Puerto Rican workers heading for home to wait out the strike. Then there are the increases in bank loans stemming from retailers in the strike areas, where credit is being extended to striking steel and coal workers. The grocer and the butcher in mill towns know the strike will be over some day and that the bills will be paid, but meanwhile they have to increase their own credit to finance the feeding of their customers. And speaking of feeding, there is one group of people who are feeding well and having little to do during the strike. They're Great Lakes sailors, whose ships are floating idly at anchor in the lake ports. Here in Cleveland, they're painting the hulls, shining the brass, eating their usual top-flight meals and enjoying shore leave every night. With storms and gales reported on the upper lakes, they're probably happy to be in snug harbor.

New Names, Same Faces

Let's see. This is October 24, and we know a secret. Next week there'll be some changes made on this page. Watch the column to our right for details. Couldn't make them this week, because we had to go to press too early. However, we've a sneaking suspicion that the editors scooped us. Could be you'll find some announcement hidden deep in the columns of the news dept.

Again—Pension Paragraphs

Also next week comes another opus from the fact-dripping typewriter of Walt Campbell, our expert on pensions who is also our news editor. Normally we'd say that the other way 'round, but we inverted it so we'd have a reason for telling you about a new article he's prepared for next week's book. Do you have fourth round wagitis? Are pension demands slowly choking the life

blood out of your treasury? Does insurance (social, that is) give you nightmares every day? Or maybe day-dreams every night? Well, if so, you'll be glad to hear that Walter J. Campbell has come up with another. This time he's talking about the effects of these plans on small business. If you read his opus on insurance and pension plans in this book last April, or like thousands of other metalworking executives you even now have a copy of it at your elbow to guide you through the maze of pension collective bargaining, we won't have to sell you this new one. If you haven't, we have just this week pulled hot off the press for the umpteenth time reprints of that April masterpiece and we'll send one to you for the asking. And in any case you'll want to study carefully the new Campbell classic whether you are big or little business.

Yoicks! Puzzles, Yet!

Okay, so you asked for it. So we hadda go and dig up some new puzzles. So we hope they're new to all of you folks who have challenged us to stump them. That includes all New England challengers, too. The stock we now have in hand are old, tried and true, but new to us, and we will have to add that we can't figure some of them out, yet, even though we have the answers written down on little pieces of paper here and there. At any rate, here starts our new series, and we hope you can't answer them! For the first one, we have two characters making up a large flag to hang in the city park. In order to make the stars, they were supplied with white circles of cloth, ten inches in diameter. After cutting out a few stars, the first character remarked to the second, "They shouldn't have cut this cloth into circles. We are wasting more cloth from each piece than it takes to make a star." The second character, being either a puzzle fan or else mentally alert for some other reason, had his doubts, but finally proved it to his satisfaction. Can you do the same? What was the area of the star?

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Vol. 125—No. 17 October 24, 1949

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